


Welcome to BIMM 101 – Recombinant DNA Techniques Lab!

Course Information

Course Description	In BIMM101 we aim to function as an inclusive learning community to develop an understanding of research in molecular biology through experimental design, critical analysis of data and literature, and experimentation. We will be spending most of our time working on a CRISPR editing experiment.
Credits	4 credits. Class + lab + course work is approximately 15-16 hours per week (some weeks will vary because of shorter labs, or increased studying time). <i>Lab courses are intense! Use time wisely – block off time to be prepared for class and lab. If lab activities finish early, use that blocked-off time to prep for the next lab.</i>
Class times	Class: W/F, 11:30am-12:50pm, TATA Hall Learning Studio (2501) Lab: W/F 1:30-4:20pm, York Hall 4318 and 4332 (check your registered section)
Materials	<ul style="list-style-type: none"> • Lab Notebook (we will provide a paper copy during Lab 1) • Tablet or laptop to use in lab if you have one. We use the computer in every lab to enter notes in our digital lab notebooks. We do loaner laptops that you can use during lab time if you do not have access to one to bring. • Knee-length laboratory coat (available at bookstore) • UV-blocking safety glasses or goggles (available at bookstore) *highly recommend glasses instead of goggles for comfort* • Fine-tipped sharpie pen (dark color) for labelling tubes in the lab • Masks required in lab and class at all times • All labs: Long pants or skirts and closed-toe/heel shoes are required in lab <p>Please see general lab policies here: https://biology.ucsd.edu/education/undergrad/covid-19.html#Biology-Lab-Policies-and-Fees</p>
Instructor	<p>Dr. Lisa McDonnell, lmcdonnell@ucsd.edu https://biology.ucsd.edu/research/faculty/lmcdonnell.html</p> <p>I will only send communication via my UCSD email address or Canvas. I do my best to reply within 24 hours Mon-Fri.</p> <p><u>Office hours.</u> See Canvas for details.</p> 
Instructional Assistants (IAs)	<p>Michelle Liu, m2liu@ucsd.edu Ayuna Jombik, ajombik@ucsd.edu</p>

BROAD LEARNING GOALS

- Apply knowledge of molecular biology concepts and lab techniques to plan experiments, explain and troubleshoot results
- Explain the importance of proper controls in designing experiments and interpreting results
- Perform basic lab math skills, statistical analysis, and graphing
- Conduct experiments using various recombinant DNA/molecular biology techniques
- Draw conclusions based on evidence and reasoning
- Use basic bioinformatics databases and applications
- Find, read, and evaluate primary literature
- Critically evaluate scientific writing (your own, and that of peers)

More detailed learning objectives will be provided in each class.

Course Schedule & Format

[Course schedule](#) (also please check Canvas on a regular basis)

This is an in-person course. During lecture we will review the work we are doing in the lab *that day*. For this reason, it is highly recommended that you attend class, and are prepared by having read the relevant lab manual sections for the day prior to coming to class.

This course is designed to be an environment for everyone to learn and construct a shared understanding of the material. **Active participation by asking and answering questions and participating in discussions (e.g., during office hours, class, lab), is encouraged.** Being able to communicate understanding, and confusion, is critical to success in any discipline, and is very useful for learning. To encourage collaboration, grades will not be assigned on a curve. Instead of memorization, we will focus on developing an understanding of fundamental concepts as they apply to different examples. Therefore, tests and assignments will include questions that are based on solving problems in new contexts, analyzing and interpreting data to draw conclusions, and critiquing claims.

Laboratory Attendance

Attendance in laboratory is required. Attending the first lab is required to maintain your seat in the course. Additional policies are available online

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

Although we do not want you to attend if you are ill or have an unexpected emergency, it is important to recognize that participation in the lab is very important for learning and success in the course. Only the instructor can approve an absence. Please get in touch with your instructor as soon as possible if you are unable to attend lab because of illness or an emergency (at that time the instructor will determine documentation is required). In excused cases the instructor will work with you to ensure you are able to complete the required course work. An unapproved absence will result in a 2% drop in course grade, and two unapproved absences will result in a failing course grade.

Recommended Weekly Workflow ~15-16 hours per week:

1. Pre-class/lab preparation ~2 hours per week (~1 hour per lab)

Check the course schedule and weekly modules on Canvas. Read the relevant background and protocols in the lab manual and complete the “before lab work” in your lab notebook (work to be done in your lab notebook is detailed in a document called “Lab Tasks” posted within each weekly module). I also recommend you review the class slides for the upcoming week. It is important to engage in pre-class/lab learning so that you get the most out of our of class discussions. In my experience, students that have done the pre-lab work and review are able to complete the in-lab work more efficiency.

2. Attend class ~ 3 hours per week

During class we will review data collected in prior labs and discuss what is coming up in the lab that day. We will engage in discussion, answering questions/problem solving.

3. Lab ~ 8 hours per week (2 x 3-hour 50 minute sessions scheduled).

During lab you will follow the necessary protocols (Lab Manual) and work outlined in the Lab Tasks Document (posted in weekly modules on Canvas). You will be doing work in your assigned lab notebook (Google Doc). The goal is to finish your lab notebook entry during lab time. You can also use lab time to ask questions and get feedback on your work! Use the time in lab effectively – this will help you to stay on top of work and reduce outside of lab work.

4. Weekly Recap Quizzes on Canvas ~30 minutes - 1 hour

Most weeks there is a Recap Quiz on Canvas that covers material from the *prior* week. The purpose is to review some key concepts. It helps to flag any points of confusion. If you have time in the Friday lab, start the weekly Recap Quiz! You are welcome to ask us questions if you are feeling confused.

5. Additional study/work time – variable (e.g., ~1-2 hours per week)

This lab class is based on application of knowledge and problem solving. This requires time to think, practice, and seek help! Do not rely on cramming. Spaced practice and using time in lab to complete work and get feedback is recommended.

Overall Course Expectations

What you can do to support your success in the course:	What I will do to support your success in the course:
Read the syllabus and stay current with course information	Be prepared and bring my enthusiasm for teaching to each session
Keep up with class material, practice questions, homework	Respond to emails within one working day*, answer questions during office hours and provide timely feedback on assignments / submissions.
Contribute to the learning environment with fairness, cooperation, and professionalism	Establish a learning environment with fairness, cooperation and professionalism, and will take action if these principles are violated.
Treat your classmates, instructional assistants and myself honestly and ethically	Treat you honestly and ethically, and will address any concerns you might have
Commit to excel with integrity ¹ . Have the courage to act in ways that are honest, fair, responsible, respectful & trustworthy.	Uphold integrity standards and create an atmosphere that fosters active learning, creativity, critical thinking, and honest collaboration.
Manage your time, so you can stay on track with the course and complete tasks on time	Only assign work that is vital to the course, and will work to meet the standard credit hour allotment for the course.
Communicate with me if you determine that a deadline cannot be met due to extenuating circumstances	Consider requests for adjustments and will make reasonable exceptions available to all students when approved

1. Please read UC San Diego's [Policy on Integrity of Scholarship](#) and take the [integrity pledge](#)!

* I am happy to answer questions that are not already addressed in class, on Canvas, or in the syllabus. Please check these resources first.

Assignments and Grading

Bolding indicates flexibility to accommodate for illness/emergencies (elaborated in section below)

*Indicates flexible grading, see descriptions.

Please consult course schedule for due dates.

Assignment	Points	Explanation
Syllabus Quiz	1	Review of the syllabus and course components is an important step in understanding the course organization. You will have two attempts at this quiz, the highest score accepted.
Molecular Biology Review	3	This is a set of questions meant to review some pre-requisite genetics and molecular biology concepts, as well as some questions on experimental design and drawing conclusions. This assignment will be scored 1.5 points for on-time completion, and 1.5 points for correctness. Instructions to submit the assignment will be posted on Canvas.
Weekly Recap Quizzes on Canvas	6	The quizzes posted on Canvas are meant as a review of some concepts covered in class and lab the week prior. Note, these are often easier than what you will find on the tests and final exam but are a good way to know if you are keeping up with the basics of the material. Please follow-up on things you are confused about! Ask questions in class or lab, come to office hours! Most weeks a Recap Quiz is due Monday at 11:59pm (e.g., Monday of Week 1 there will be a Recap Quiz about the material from Week 0). There will be approximately 7 Recap Quizzes. The lowest score is dropped and if your average score on the remaining quizzes is 85% or higher, you will receive full points (adjusted at the end of the quarter). This means it is ok to miss a question here and there, and one quiz. Because the lowest score is dropped there are no extensions or make-ups for missed quizzes because of illness or emergencies
Lab Notebooks	15	Each student will be assigned an individual digital lab/research notebook (Google Doc) that you will use for the quarter. The link to your notebook will be sent to you by email. 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. Please consult the lab notebook guidelines (Canvas), which includes a link to an example notebook. In the notebooks you will put before and in-lab work (as outlined in the Lab Tasks Document, and occasional supplemental instructions on entries will be on Canvas). Lab notebook entries will be randomly checked for both before-lab work and in-lab work. In total, 6 entries will be checked and scored. The lowest score will be dropped. The remaining scores will be averaged, and the average used to

		<p>determine the points out of 15 (e.g., if your average is 85%, you will receive 12.75 out of 15 course points). Prior to the first graded entry, we will review an entry for feedback. Also, you are welcome to ask for feedback about your work during lab time or office hours! If you find yourself unable to complete an entry because of illness or emergency, that will count as your lowest/dropped score.</p> <p><i>Another note: the requested before-lab and in-lab work that you put in your lab notebook is to help you work through the lab, but also to make sense of the results and protocols in a way that will strengthen your understanding, which is helpful for tests.</i></p>
Quizzes #1-4 (in lab)	20*	<p>Quizzes #1-4 (occurring in lab) will largely be about your understanding of the experiments, protocols, and making sense of results to draw conclusions. All quizzes are open notes. The lowest quiz score is dropped (if you miss a quiz because of illness or emergency, this counts as your lowest/dropped score). The remaining three scores will be weighted as follows: highest 10/20, mid 6/20, lowest 4/20.</p>
Quiz #5	15*	<p>This is our final in-lab quiz. It will largely be an experimental design exercise. Information will be provided in class and on Canvas. It is open notes. If you miss this quiz because of documented illness or emergency, you may be eligible for an “I” to take the test at a later date. However, this will have to be approved by myself and the Dean of Student Affairs of your college. You are only eligible for an “I” if you are currently passing the course and have taken at least 3 of the prior quizzes.</p>
CRISPR Write-Up	25*	<p>The goal of the write-up is to write a scientific article to present results of our CRISPR experiment, including an introduction, methods summary, presenting and summarizing results, as well as constructing scientific arguments (what you can conclude, evidence to support, and providing reasoning in the form of a biological/molecular/experimental explanation or hypotheses. A draft will be submitted for peer-review, and then a final version. Guidelines and rubrics will be provided on Canvas.</p>
TAS2R38-PTC Assignment	6	<p>This assignment will involve analyzing genotype-phenotype data generated by yourself, and the class, and answering questions posted in the assignment. The assignment will be posted on Canvas, please consult the course schedule for due date.</p>
Professionalism	4	<p>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</p>

		<p>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 for new opportunities that you may or may not be aware of. Professionalism can be demonstrated through being prepared, individually demonstrating meaningful participation in the course (especially during lab time), maturity and respectful behavior towards others.</p> <p>Please see below for more details on professional conduct.</p> <p>As part of professionalism, you will be asked to conduct a professionalism self-reflection part way through the course. Genuine completion of the reflection is worth 2 points, and the remaining 2 points is based on our observations of your professionalism. 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 the teaching team, which includes but is not limited to 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.</p>
*Flex points	5	Because different people may excel in different aspects, quizzes (#1-4) or the CRISPR write-up or quiz #5 will be worth 25% (tests #1-4), or 30% (CRISPR write-up), or 20% (quiz #5), depending on what benefits each individual student, bringing the total to 100.
Total	100	
Bonus opportunity	1 point on final course score	(e.g., surveys – will be posted on Canvas)

Grading Scale

The following grading scheme will be used. The course is **not** graded on a curve (i.e., 20% of students getting A, 20% B, 20% C, and such). Thus, the ability to do well in this course is not dependent on others doing poorly.

A+	96-100
A	90-95
A-	85-89
B+	81-84
B	80-83
B-	76-79
C+	72-75
C	67-71

C-	62-66
D	50-61
F	0-49

DO NOT USE THE "TOTAL POINTS" IN CANVAS GRADES TO DETERMINE YOUR GRADE. The total column does not account for flexible weighting and dropping of low scores (for some components of the course) - thus, it is not an accurate reflection of your grade. Occasionally I will post updates - and you can always estimate your grade using the weighting scheme described above and information below.

Professionalism

Example interactions with meaningful benefits:

- 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 in 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
- Clarifying course material that facilitates deeper learning
- Reporting errors or problems in class, on assignments, or for other course material
- Arriving on-time to lab sessions and being prepared to work in lab

Example interactions that have no meaningful benefits and thus should be avoided:

- Not showing up or being late to lab session
- Contributing inequitably to teamwork
- Harassing and/or bullying the instructional team or other students, either in person or online
- Asking questions when the information is already available or will eventually be known (this does not include asking clarifying questions about content/concepts)
- Ignoring the directions or requests from the instructional team

Summary of accommodations for illness and emergencies

Review the descriptions of the course work above and how flexible policies are built in to almost every part of the course to accommodate for illness and emergencies resulting in a missed assignment or test. Because there is built-in flexibility there are **no make-ups or late assignments accepted for quizzes #1-4, weekly recap quizzes, lab notebooks**. Late work/missed quizzes count as a zero. If you are unable to submit something on time because of illness or emergency, you are still encouraged to do the work and ask for feedback. If a serious illness or emergency interferes with the CRISPR write-up, please discuss with your instructor (documentation may be requested).

What if I am feeling sick/have an emergency on a test day?

Do not attend class, lab, or tests if you are ill. This missed test will count as your lowest (dropped) score.

What if I miss the final quiz (#5) because of illness or an emergency?

In the case of a missed final quiz, you will be asked to provide documentation to both me and the Dean of Academic Affairs and/or Student Affairs of your college. Upon receipt of documentation, it will be determined if you can receive a grade of “Incomplete” (“I”). Students with an incomplete will have the opportunity to take a final exam at a later date – set by the instructor. **You must have a passing grade in the course to be eligible for an Incomplete** (in addition to the approved reason and documentation noted above). **You must have taken at least three of the previous four in-lab quizzes in order to be eligible for an “Incomplete”** (in addition to documentation).

Teaching Philosophy

My philosophy is rooted in research on how people learn. This course is designed to encourage discussion, problems solving, collaboration, frequent feedback, and the development of self-regulated learning and metacognitive skills (planning, frequent practice, reflection on performance). I strive to create an environment for everyone to learn together and construct a shared understanding of the material. My goal is to promote critical thinking such that you can apply your knowledge outside of class and can share it with others.

We will focus on developing an understanding of fundamental concepts as they apply to different examples. Therefore, tests and the exam will include questions that are based on solving problems in new contexts (analysis, applying knowledge, generating ideas, justifying with reasoning). We *will not* focus on memorization. Questions on tests will be based on learning objectives.

Human interaction and communication is very important and helpful when learning! I encourage you to take advantage of all the course components, and please attend class, office hours and discussion sections to engage with me, the IAs, and one another!

Academic integrity

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

Integrity of scholarship is essential for an academic community. The University expects that both students and faculty 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. In this course, we need to establish a set of shared values. Following are values* adopted from the [International Center for Academic Integrity](#), which serve as the foundation for academic integrity.

	As students we will.....	As the teaching team we will.....
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Honesty	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Complete assignments on time and in full preparation for class Show up to class on time and be mentally and physically present Participate fully and contribute to team learning and activities 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Speak openly with one another while respecting diverse viewpoints and perspectives Provide sufficient space for others to voice their ideas 	<ul style="list-style-type: none"> Respect your perspectives even while we challenge you to think more deeply and critically Help facilitate respectful exchange of ideas
Fairness	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Create fair assignments and exams and grade them in a fair and timely manner Treat all students and collaborative teams equally
Trustworthiness	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Say or do something when we see actions that undermine any of the above values Accept the consequences of upholding and protecting the above values 	<ul style="list-style-type: none"> Say or do something when we see actions that undermine any of the above values Accept the consequences of upholding and protecting the above values

** This class statement of values is adapted with permission from Tricia Bertram Gallant Ph.D.*

All course materials are the property of the instructor, the course, and the 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 work associated with the course is expected to be done by you, the enrolled student, and you alone. Discussing overall concepts is a great way to help in learning, but it is not permitted to discuss question answers or share answers.

I take academic integrity very seriously. Any suspected instances of a breach of academic integrity will be reported to the Academic Integrity Office for review and possibly given a score of 0.

Regrades

If a grading error has been made, you should submit a re-grade request via GradeScope. Students who submit items for re-grading understand that **the instructor may re-grade the entire test/homework and the score may go up or down**. Regrade requests may not be processed until the end of the quarter, and at that time there will be no regrades for a student with an A or A+.

Accessibility

<http://disabilities.ucsd.edu> | osd@ucsd.edu | 858-534-4382

Any student with a disability is welcome to contact me early in the quarter to work out accommodations to support their success in this course. Students requesting accommodations for this course due to a disability should work through the Office for Students with Disabilities (OSD). Instructors will receive Authorization for Accommodations Letters from the OSD online portal. Whenever possible, we will use universal designs that are inclusive. If you have feedback on how to make the class more accessible, please get in touch!

Inclusion

It is our goal to create a learning environment that supports diversity of thought, perspective, experience, and identities. We encourage all of you to participate in discussion and contribute to the field from your perspective. If you have feedback on how to make the class more inclusive, please get in touch!

Office of Equity, Diversity, and Inclusion:

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

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

<https://regents.universityofcalifornia.edu/governance/policies/4400.html>

Resources for Support and Learning

Learning and Academic Support	
Ask a Librarian: Library Support	

<p><i>Chat or make an appointment with a librarian to focus on your research needs</i></p> <p><u>Course Reserves, Connecting from Off-Campus and Research Support</u> <i>Find supplemental course materials</i></p> <p><u>First Gen Student Success Coaching Program</u> <i>Peer mentor program that provides students with information, resources, and support in meeting their goals</i></p> <p><u>Office of Academic Support & Instructional Services (OASIS)</u> <i>Intellectual and personal development support</i></p>	<p><u>Writing Hub Services in the Teaching + Learning Commons</u> <i>One-on-one online writing tutoring and workshops on key writing topics</i></p> <p><u>Supplemental Instruction</u> <i>Peer-assisted study sessions through the Academic Achievement Hub to improve success in historically challenging courses</i></p> <p><u>Tutoring – Content</u> <i>Drop-in and online tutoring through the Academic Achievement Hub</i></p> <p><u>Tutoring – Learning Strategies</u> <i>Address learning challenges with a metacognitive approach</i></p>
<p>Support for Well-being and Inclusion</p>	
<p><u>Basic Needs at UCSD</u> <i>Any student who has difficulty accessing sufficient food to eat every day, or who lacks a safe and stable place to live is encouraged to contact: foodpantry@ucsd.edu basicneeds@ucsd.edu (858) 246-2632</i></p> <p><u>Counseling and Psychological Services</u> <i>Confidential counseling and consultations for psychiatric service and mental health programming</i></p> <p><u>Triton Concern Line</u> <i>Report students of concern: (858) 246-1111</i></p> <p><u>Office for Students with Disabilities (OSD)</u> <i>Supports students with disabilities and accessibility across campus</i></p>	<p><u>Community and Resource Centers Office of Equity, Diversity, and Inclusion</u> <i>As part of the <u>Office of Equity, Diversity, and Inclusion</u> the campus community centers provide programs and resources for students and contribute toward the evolution of a socially just campus (858).822-.3542 diversity@ucsd.edu</i></p> <p><u>Get Involved</u> <i>Student organizations, clubs, service opportunities, and many other ways to connect with others on campus</i></p> <p><u>Undocumented Student Services</u> <i>Programs and services are designed to help students overcome obstacles that arise from their immigration status and support them through personal and academic excellence</i></p>

Health and Well-Being Statement

Students may experience stressors that impact academics and personal well-being. These can include academic stress and pressure, relationship challenges, mental health, drugs and alcohol, identities, finances, and other factors. If you are experiencing stress and concerns it is courageous to seek help! If your stressors are academic, please contact me and I am happy to discuss solutions. I would also encourage you to reach out to the Dean of Academic Affairs for your college. For additional stressors UCSD offers a variety of resources, some of which you can find here: <https://vcsa.ucsd.edu/student-success/student-well-being.html>

Subject to Change Policy

The information contained in the course syllabus may be – under certain circumstances (e.g., to enhance student learning) – subject to change with reasonable advance notice, as deemed appropriate by the instructor. Any changes are announced on Canvas (please be sure to have your notifications settings on to receive updates/emails/announcements).

Letter of Recommendation Policy

If you think you may want me to write you a letter of recommendation (or any other instructor), please consider what a good letter would contain and how your actions in the course demonstrate the qualities you will want highlighted in a letter. When students ask me for a letter of recommendation, I ask them to write to me about how they demonstrated critical thinking, leadership, collaboration, and professionalism. I will be specifically looking for examples of these qualities *that I would have observed* during class, lab, and office hours. Be sure to actively participate in the discussions, talk to me during class and office hours, ask questions, offer your own ideas and interpretations of what we are covering, bring interesting facts/papers that are connected to the material we are studying. If you don't actively show the qualities that are needed to write a good letter, it will be hard for me to write a letter that is meaningful and useful.

Technical Support

For help with accounts, network, and technical issues:

<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/>

Campus Policies

- [UC San Diego Principles of Community](#)
- [UC San Diego Policy on Integrity of Scholarship](#)
- [Religious Accommodation](#)
- [Nondiscrimination and Harassment](#)
- [UC San Diego Student Conduct Code](#)