

Instructor:

Dr. Cindy Gustafson-Brown cgb@ucsd.edu

Office Hours: Tuesday 2:50-3:20 PM. Location TBA. (starting Oct 5)
Tuesday 1-2 on zoom.
Also, please make use of time in the lab to talk (especially at the end)!

Instructional assistants:

D01 Saroj Gourkanti sgourkan@ucsd.edu

D02 Bindhu Hosuru bhosuru@ucsd.edu

Course site: <https://canvas.ucsd.edu/>

Course structure:

Lecture

- Before Lecture: Review “Lab Tasks,” posted on Canvas.
Read relevant background and protocols in lab manual (assigned reading is posted on the lab schedule)
Take online reading quiz.
- In lecture: Review important concepts, skills, lab protocols

Lab

- Before: Complete “before lab” work in lab notebook (see Lab Tasks posted on Canvas)
- During lab: engage with peers, IAs & instructor to complete tasks, including experimental design, lab protocols, data analysis, and troubleshooting.
- By end of day: Complete the lab notebook entry for that day.

Other

- **Tests** (in lab) and **writing assignments** provide practice for applying knowledge and skills.

We will be sticking to the outlined plan as much as possible, but there may be times when the plan needs an adjustment as the Covid situation evolves. Any and all changes will be clearly communicated to the class. Adjust your settings in Canvas to ensure you receive notifications. Thank you for your patience!

In-person Lectures: Tues/Thurs 3:30-4:50 PM, Sequoia 148

Laboratory sessions: Wednesdays and Fridays, 12-3:50 PM (PST)

Some days will be in-person in the lab.

Some days will be on zoom.

Course Schedule is on Canvas.

Impact of COVID on classes

COVID-related lab policies can be found there:

<https://biology.ucsd.edu/education/undergrad/covid-19.html#Biology-Lab-Policies-and-Fees>

General COVID information for UCSD is here:

<https://vcsa.ucsd.edu/news/covid-19/>

There is information on student well-being here:

<https://studentwellbeing.ucsd.edu/>

Check out this UCSD website for resources on how to learn remotely:

<https://digitallearning.ucsd.edu/learners/learning-remote.html>

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|---------------------|----------------------------------------------------------------------------------------------------------------------|
| Lectures | will be delivered in-person and podcast. Masks must be worn in the classroom. |
| Lab sessions | will be in-person on some days and on zoom other days. (see schedule)
KN95 masks or double-masks required in lab. |
| Tests/exams | will be in-person, in the lab. |

Welcome to BIMM 101: Recombinant DNA Laboratory!

In BIMM101 we aim 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.

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
- Read, and evaluate primary literature
- Critically evaluate scientific writing
- Collaborate with one another to learn foundation biological concepts and laboratory skills

COURSE DESIGN

We assume you are here to learn. Just like athletic training for your body, learning requires **effort**. Readings in the lab manual lay the foundation for our lectures. Prior reading of the lab manual **before** lecture **is expected** in this class. There may be additional, pre-class materials (relevant background information) assigned to enhance your understanding. An online reading quiz will be due before lecture. There will also be one film which students are required to view.

We strive to create a **collaborative** environment in this course, in which students work together in a constructive way. To encourage collaboration, grades will not be assigned on a curve. You are not in competition with your classmates, and you may ALL succeed!

Actively asking and answering questions and participating in discussions with classmates, the IAs, and the instructor is encouraged. Being able to communicate both understanding *and* confusion is critical to success in any discipline, and is useful for learning¹. Confused? Ask questions! If you understand, help your classmates! Students are expected to be active learners! Take charge of your own success!

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.

1 Smith et al., 2009. <http://www.sciencemag.org/content/323/5910/122.short>

LAB SAFETY

Safety precautions are crucial in the laboratory setting. Appropriate laboratory attire and personal protective equipment (PPE) are required. There is no eating or drinking allowed in the lab.

Enrolled students **MUST** successfully complete the Biology Lab Safety Training & Assessment **before** the second lab session (Sept 29): <https://biolabclass-safetyquiz.ucsd.edu/introduction>

Please note that courses offered by other departments (Chemistry, for example) may have additional safety training requirements.

ABSENCES AND LATE POLICY

Attendance is expected for ALL lab days (Wed/Fri). The experiments are designed for groups of 2-4 students and your absence would increase the workload on your partners. If there is a genuine emergency or health issue, you should contact your instructor (Dr. Gus) AND your IA by email PRIOR to the start of the lab you will miss. We can generally work around those problems.

As of this writing (9/18/2021), UCSD's policy is that "Vaccinated students who have been exposed [to COVID-19] are allowed to attend class and move about campus masked." **This does not include people who have COVID symptoms or a positive test result.** If you are concerned that you would endanger others by attending, please email me as soon as possible to discuss your situation. You can find an up-to-date policy and more details here: <https://returntolearn.ucsd.edu/return-to-campus/exposure-contact-tracing/index.html>

Absences due to scheduling conflicts will not be excused.

The first unexcused absence will carry a 75-point penalty from the total for your grade. (There are 1000 points in the quarter.) If there is a second unexcused absence, you will be asked to drop the class or receive an F in the course. If you anticipate multiple absences this quarter, I suggest you withdraw from the course and enroll during a later quarter when you are available to attend all labs.

Tardiness in the lab will impact your grade. You will miss important announcements and instructions. You may miss a quiz. And it puts an undue burden on your partner. If you are late more than once, you may be asked to drop the course.

WHAT TO BRING TO THE LAB

1. **Lab coat:** All students need to bring a long lab coat (roughly to the knees, not the short hip length version).
2. **Eye protection:** All students need to bring UV-blocking goggles or safety glasses. These are required even if you wear prescription eye glasses. It is strongly recommended that you do not use contact lenses while working in the lab. The bookstore has **anti-fog** safety glasses that fit over regular glasses. They also are selling an anti-fog solution for \$4. Pyramex™ S2510ST anti-fog glasses are available online and are recommended for their anti-fog properties.
3. **Masks** are required. You must provide your own masks. You may use one of the following configurations
 - a. KN95 respirator mask
 - b. a non-KN95 disposable mask under a cloth mask
4. Anyone with long hair (male or female) needs to wear or bring a **hair tie** to lab (and USE IT).
5. Wear **closed-toed, closed-heeled shoes**. Sandals, flip-flops, or any other open footwear are not permitted in the lab. If you show up wearing inappropriate footwear, you will be turned away.
6. **Long pants**, not leggings. Tight or cropped pants are not allowed. Shorts are not allowed.
7. **Permanent markers** (Sharpies), preferably fine point rather than thick. Do not get the ultrafine as they do not work well in the lab. You will need these for marking on your media plates and tubes. Black or blue are preferred. Avoid red or any light color (however pretty).
8. **Bound, lab notebook** with carbon copies. You may use the remaining pages in an old lab notebook if:
 - a. there are pages available at the front for a table of contents
 - b. there are plenty of pages at the back for our experiments
9. **Lab manual** – “BIMM 101 Recombinant DNA Lab Manual, Fall 2021” is available at the UCSD Bookstore
10. **Laptop computer** – is not required, but is often helpful

COMPUTERS

We will often use computers for data analysis and other exercises. We have access to a few computers in the lab, however if you have your own laptop computer it is recommended you bring it to lab.

GRADING

The following grading distribution will be used. The course is **not** graded on a curve. Thus, your ability to do well in this course is not dependent on others doing poorly.

A = 88% - 100%

B = 77% - 87.9%

C = 66% - 76.9%

D = 57% - 65.9%

F = below 57%

There will be pluses and minuses assigned.

Components of the grade	Points	Percent
13 reading quizzes (4 pt each, lowest dropped)	48 points	4.8%
molecular biology review (lab 2)	20 points	2.0%
8 lab notebook submissions (lowest dropped)	140 points	14.0%
5 lab quizzes (54 pt each, lowest dropped)	268 points	26.8%
CRISPR write-up	214 points	21.4%
TAS2R38/PTC Assignment	55 points	5.5%
Lab skills and professionalism	55 points	5.5%
<u>Comprehensive exam</u>	<u>200 points</u>	<u>20.0%</u>
Total	1000 points	

Reading quizzes: For each lab, whether on zoom or in-person, there is a reading assignment indicated in the lab schedule. This should be read *prior to the lecture* (before the lab). For many, though not all, of the reading assignments, there will be an online quiz. These reading quizzes are cumulatively worth 4.8% of the final grade. They will be posted at least 24 hours prior to lecture, and will consist of 3-4 questions. Students are expected to complete these quizzes on their own without collaboration. You will have two attempts to get the answers correct. Each quiz is **due by noon** on the day of the relevant lecture. If the quiz is not posted by noon on Mon or Wed, you can assume there will not be a quiz.

The lowest grade will be dropped. These quizzes are a good chance for you to notice if you are confused on certain topics or protocols. **Please follow-up on things you are confused about! Ask questions in class or lab, come to office hours!**

Molecular Biology Review Assignment: An assignment with questions to review some basic biology and experimental design concepts will be due during Week 1. Just completing the quiz earns you half the credit. The other half comes from accuracy, although you only need to get 85% correct to get full credit for accuracy. Instructions to take and submit the quiz will be posted on Canvas.

Lab notebooks: Keeping a thorough and organized lab notebook is an essential skill for any lab researcher. One of our goals is to help you develop good habits in keeping a notebook. In

this lab, we will use a hard-copy notebook, rather than online notebooks. Please consult the lab manual for what we expect in the lab notebooks, and use the template provided in the Google doc.

On certain in-person lab days (see schedule), students will tear out the carbons, staple them, and submit them to the IA for grading. Assessment of the lab notebooks will include

- pre-lab work: purpose, summaries, predictions, etc
- in-lab work: calculations, observations, data analysis
- drawing conclusions in the form of an argument
 - claims
 - data to support claims
 - explanations providing a biological or procedural mechanism
 - troubleshooting when necessary

The lab notebook submissions are cumulatively worth 14% of the final grade. The lowest notebook score will be dropped.

Lab quizzes: There will be five in-person quizzes in the lab (see lab schedule). These quizzes are cumulatively worth 27% of the final grade. Quizzes will be cumulative (lectures, reading, experiments) but will focus on the more recent material. They will include the reading and lecture for THAT day's experiments. Study guides will be posted on Canvas. The lowest lab quiz score will be dropped.

CRISPR Write-up:

This assignment is to write a short scientific article to present results of the CRISPR experiment, including

- introduction
- methods summary
- results
- scientific arguments
 - what you can conclude
 - evidence to support your argument
 - reasoning biological/molecular/experimental explanations or hypotheses

A draft will be submitted for peer-review, and then a final version. Guidelines will be provided on Canvas.

TAS2R38/PTC Assignment: Students will analyze data and answer questions about the analysis. The assignment will be posted on Canvas.

Lab skills and Professionalism: All students are expected to be good lab citizens. Your attitude, cooperation with others, conscientiousness, work ethic, technique and skill in the lab will contribute to your grade.

Lab skills portion will be based on the following criteria:

- a. PRE-LAB PREPARATION
- b. PRE-LAB PREPARATION
- c. PRE-LAB PREPARATION
- d. Technical skill and careful management of lab procedures (e.g. success of experimental procedures, judicious use of reagents, proper waste disposal, etc.)
- e. Taking care of university property (consistently locking your locker, etc.)
- f. Caliber of thinking before asking questions
- g. Scientific approach (e.g. controls, experimental design, powers of observation)
- h. Accuracy
- i. Safety consciousness
- j. Organization and general neatness in lab

The **professionalism** portion of the 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. 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.

During the quarter, the teaching team will make observations which will contribute to the professionalism component of your grade, including but not limited to one-on-one interactions, electronic communication, contributions to class data sets according to deadlines, and follow-up conversations on grades. The following will be considered:

- a. Paying attention during instructions
- b. Independence and initiative
- c. Ability to adapt to unforeseen procedural changes
- d. Being responsive to correction
- e. Being respectful toward others (classmates, IA, instructor)
- f. Meaningful contribution to your group and cooperation with classmates
- g. Integrity

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

- Contributing inequitably to team work
- Harassing and/or bullying the instructional team or other students, either in person or online
- Repeatedly asking questions when the information is already available
- Ignoring the directions or requests from the instructional team

Comprehensive Exam: The comprehensive exam will synthesize concepts and skills from the entire course, and takes place in-person, during the last lab period.

LATE ASSIGNMENTS AND SUBMISSIONS

Assignments must be handed in **at the START** of lecture/lab on the due date. Assignments must be submitted on time (within 10 minutes) to be eligible for full credit. Except in the case of health or family emergencies, late assignments will be subjected to a 20% 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 zero.

In addition to the hard copy, you are required to submit an electronic copy of homework to Turnitin.com, by the due date/time. A link to the e-submission website will be provided on CANVAS. There is a penalty for late online submissions. Failure to submit to Turnitin.com will result in zero points.

By taking this course, students agree that their assignments will be subject to review for textual similarity by Turnitin for the detection of plagiarism. All submitted assignments will be included as source documents in the Turnitin reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin service is subject to the terms of use agreement posted on the Turnitin site.

REGRADES

Please see the regrade policy on Canvas.

ACADEMIC INTEGRITY

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

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.

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. **Academic misconduct** is broadly defined as any prohibited and dishonest means to receive course credit, a higher grade, or avoid a lower grade. Academic misconduct misrepresents your knowledge and abilities, which undermines the instructor's ability to determine how well you're doing in the course.

In this course you will often be doing experiments and collecting data with a group, and I encourage you to discuss and share thinking. It is important to get feedback on your ideas and work, but you are still responsible for producing your own work, in your own words, from your own effort. You must hand in your own assignments, *written in your own words*. **Copying someone else's lab report or homework is cheating. Showing your homework to someone else is likewise cheating.**

Any suspected instances of a breach of academic integrity will be reported to the Academic Integrity Office for review. Depending on the severity of the case, penalties will be imposed that may include a failing grade in the course. Please do not risk your future by cheating.

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.....
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.

Student Resources for Support and Learning**ACADEMIC SUPPORT**

Geisel Library	Research tools and eReserves
Content Tutoring with the Teaching + Learning Commons	Drop-in and online tutoring through the Academic Achievement Hub
Supplemental Instruction with the Teaching + Learning Commons	Peer-assisted study sessions through the Academic Achievement Hub to improve success in historically challenging courses
Writing Hub Services in the Teaching + Learning Commons	Improve writing skills and connect with a peer writing mentor
Learning Strategies Tutoring	Address learning challenges with a metacognitive approach
OASIS	Intellectual and personal development support
Student Success Coaching Program	Peer mentor program that provides students with information, resources, and support in meeting their goals

TECHNICAL SUPPORT

Technical Support	Assistance with accounts, network, and technical issues (not MindTap)
Connect from Off-Campus	Help connecting to electronic library resources such as eReserves and e-journals

STUDENT RESOURCES

Basic Needs	Provides access to food, housing, and financial resources
Counseling and Psychological Services (CAPS)	Provides confidential counseling and consultations for psychiatric services and mental health programming
Community Centers	As part of the Office of Equity, Diversity, and Inclusion the campus community centers provide programs and resources for students and contribute toward the evolution of a socially just campus

Office for Students with Disabilities	Documents students disabilities, provides accessibility resources, and reasonable accommodations
Triton Concern Line	Report students of concern at (858) 246-1111
CARE at the Sexual Assault Resource Center	Support for victims of sexual assault 858.534.5793

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 reasonable accommodations to support their success in this course. Students requesting accommodations should provide a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities (OSD), prior to eligibility for requests. Receipt of AFAs in advance is necessary for appropriate planning for the provision of reasonable accommodations. Instructors will receive Authorization for Accommodations Letters from the OSD online portal. Instructors are unable to provide accommodations unless they are first authorized by OSD. For more information, contact the OSD at (858) 534-4382 (voice), osd@ucsd.edu, or visit osd.ucsd.edu

INCLUSION

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>

CHILDREN AND VIDEO SESSIONS

You are welcome to have children with you during video sessions as I fully understand that childcare situations may be complicated for many of us at this time. If there is distracting noise in your home, you may mute/unmute your microphone as you need. Do your best to participate and engage, but also please get in touch with me if you have any questions or concerns.

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/>, or <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 | <https://care.ucsd.edu>

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

LETTERS OF RECOMMENDATION

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 good 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 could have noticed* during lab and office hours. Be sure to actively participate in the online labs and discussion groups, and talk to me my office hours: ask questions, offer your own ideas and interpretations of your results, 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.

SUBJECT TO CHANGE POLICY

The information contained in the course syllabus, other than the grade and absence policies, may be – under certain circumstances (e.g. to enhance student learning) – subject to change with reasonable advance notice, as deemed appropriate by the instructor.