Course Syllabus

Teaching Staff:

Instructor:	Chris Day	cdday@ucsd.edu (mailto:cdday@ucsd.edu)
IA for A01	Max Cai	hocai@ucsd.edu (mailto:hocai@ucsd.edu)
IA for A02	Justin Lee	jzl010@ucsd.edu (mailto:jzl010@ucsd.edu)
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IA for A04	Gabriel Vucelic-Frick	gvucelic@ucsd.edu (mailto:gvucelic@ucsd.edu)

Lecture: **A**00 : Tu/Th 3:30 - 4:50pm PODEM 1A20

All lectures will be in-person. They will be recorded and posted in the Media Gallery and embedded into the weekly course pages.

Laboratory Schedule: All lab classes will be in-person, unless otherwise stated. See the **full 10 week lab schedule**.

A01 : W/F 8:30 - 12:20 pm York Hall 4318

A02 : W/F 8:30 - 12:20 pm York Hall 4332

A03 : W/F 2:00 - 5:50 pm York Hall 2310

A04 : W/F 2:00 - 5:50 pm York Hall 2332

Office Hours: Mon 3pm-4pm, HSS Rm1145L

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 learning[1] (http://www.sciencemag.org/content/323/5910/122.short) .

We like to use class time to work on applying knowledge and troubleshooting your data. 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 regular in-class quizzes.

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)

Lab Schedule Fall 2023 - BIMM 101 Lab Schedule.jpg

Lab #	Week-day	Date	Lab Activities	Relevant Lab Manual Sections *If blank, check Canvas for details*	Assignment Schedule/Due Dates
1	Fri	Sept 29	Intros, safety, dilutions	How to Use the Manual; Working in the Lab; Keeping a Good Lab Notebook; Safety Rules; Instructions for disposal of laboratory waste; BACKGROUND: Pipette Operation; Liquid Measurement Units, Basic Dilutions, Serial Dilutions; PROTOCOLS: APPENDIX G, C, D	
			Be sure to have online safety training completed before the start of Lab #2 next week!		
	Sun	Oct 1			About You Quiz (Financial Aid too)
	Tue	Oct 3			Mol Bio Review Due
2	Wed	Oct 4	Molecular biology etc. review; Practice loading and running a gel	APPENDIX H; Agarose Gel Electrophoresis; PROTOCOL 6	
3	Fri	Oct 6	Find sequences in gene, and experimental design exercise	BACKGROUND: CRISPR-Cas9 Project Overview; PROTOCOLS: 1, APPENDIX B; Appendix J (Experimental Design)	In Lab Quiz1
4	Wed	Oct 11	Design gRNA and HDR templates;	BACKGROUND: CRISPR-Cas9 Project Overview - editing the ADE2 gene + Homology Directed Repair of ADE2; PROTOCOLS: 2 (2a and 2b)	
5	Fri	Oct 13	Set up 2x 10 ml E. coli cultures carrying pML104 Continue HDR design if needed	BACKGROUND: Cultures used in the lab; Plasmids used in the lab; PROTOCOLS: Protocol 3	In Lab Quiz2
6	Wed	Oct 18	Extracting pML104 plasmid, running agarose gels to check extractions HDR voting	BACKGROUND: Alkaline Lysis Plasmid Purification; Spectrophotometric Analysis of DNA & RNA; Agarose Gel Electrophoresis; PROTOCOLS: Protocols 4, 5, 6 for doing in the lab	
7	Fri	Oct 20	Restriction enzyme digestion; Check digestions with agarose gel electrophoresis, clean digested plasmid for future use in ligation	BACKGROUND:Restriction Enzyme Cloning (Restriction enzymes); PROTOCOLS: 5, 6, 7, 8	In Lab Quiz3
8	Wed	Oct 25	Plan and set-up ligations; transform E. coli	BACKGROUND: Restriction Enzyme Cloning (Ligations, Annealed Oligo + Restriction Enzyme Cloning) Protocols 9 and 10	
9	Fri	Oct 27	Count colonies; Each group chooses one colony and streaks it on two LB+Amp plates. One plate will grow as back-up stock, one will grow for sending to Eton for sequencing; analyze colony count data	PROTOCOLS: 10 (Analyzing E. coli transformations), 11b (sending for sequencing)	In Lab Quiz4
	Sun	Oct 29			Research Proposal Due
10	Wed	Nov 1	Analyze pML104-gRNA sequencing results Set-up pML104-gRNA culture Set up HDR extension (overlapping oligos)	BACKGROUND: Sanger DNA sequencing; Making Copies of HDR templates; PROTOCOLS: 13 (Analyze sequences); 14 (Making double-stranded HDR using overlapping oligos method);	
11	Fri	Nov 3	Extract pML104-gRNA; check on gel Check HDRs on an agarose gel, column clean	PROTOCOLS: 4, 6, 8 PROTOCOL 8 (column clean up)	In Lab Quiz5
12	Wed	Nov 8	Streak Yeast Journal article discussion	15 - Part 1 APPENDIX I	
	Fri	Nov 10	No lab - Veterans Day Holiday		
13	Wed	Nov 15	Yeast transformations (set-up plus incubate) 2nd journal article discussion	PROTOCOLS: 15 - Part 2 through step 7	
14	Fri	Nov 17	Plate yeast	PROTOCOLS: 15 - Part 2, step 8-11	In Lab Quiz6
15	Wed	Nov 22	Count yeast and start analyzing phenotype results DNA extraction from yeast colonies +	PROTOCOL: 15 Part 3 BACKGROUND: Polymerase Chain Reaction (if	

			PCR of ADE2	refresher needed); PROTOCOLS: 16, 17 (Step 1)	
	Fri	Nov 24	No lab - Thanksgiving Holiday		
16	Wed	Nov 29	Check PCRs and send for sequencing	BACKGROUND: Sanger DNA sequencing; PROTOCOLS: 17 (step 2 onward)	
			Practice sequence analysis	Protocol 18 - Part 1 to practice sequence analysis	
17	Fri	Dec 1	ADE2 sequencing results - analysis with multiple sequence alignments	PROTOCOLS: 18 - Part 2	In Lab Quiz7
	Sun	Dec 3			First Draft Lab Report Due
	Tue	Dec 5			Peer Reviews Due
18	Wed	Dec 6	Work on CRISPR write-up; peer-reviewing; writing-consultations		
19	Fri	Dec 8	Final Exam		In Lab - Final Exam
	Sun	Dec10			Final Lab Report Due and Lab Notebook Due

Grading

BIMM101 has multiple grading components:

'Weekly' Review Quizzes	25
Lab notebooks	10
Molecular Biology Review Quiz	2
Research Proposal	10
CRISPR Lab report	25
Final Exam	22
Professionalism	6
Total	100

Weekly quizzes: The 30 minute quizzes will be during some of the in-person labs and are meant to reinforce the concepts we cover in lecture as well the skills you learn in lab. There will be seven quizzes, but you may drop the lowest two grades. **It is very important to follow-up in office hours on concepts you are 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 shared with you by your IA and it will be seeded with a

template. You can see what we expect in the **following example (https://docs.google.com/document/d/1ynU43QH13kaho1nW2SEViYFVqJJBtlDwgpfpKPu_miA/edit?usp=sharing)** .

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 see and example entry. **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.

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.

Lab Reports: 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.

For the second lab report, a draft will be submitted for peer-review, and then a final version. Check course schedule on Canvas for due-dates.

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

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.

Lab Expectations

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 points due to lack of professionalism.

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)**)

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 (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)

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/ (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
Sun Oct 1, 2023	**First Day Survey: Getting to Know You - #FinAid (https://canvas.ucsd.edu/courses/48696/assignments/695552)**	due by 11:59pm
Tue Oct 3, 2023	**Mol Bio Review (https://canvas.ucsd.edu/courses/48696/assignments/695559)**	due by 11:59pm
Sun Oct 29, 2023	**Research Proposal (https://canvas.ucsd.edu/courses/48696/assignments/695558)**	due by 11:59pm
Sun Dec 3, 2023	**CRISPR Lab Report Draft 1 (https://canvas.ucsd.edu/courses/48696/assignments/695554)**	due by 11:59pm

Date	Details	Due
Sun Dec 10, 2023	**CRISPR Lab Final Report** (https://canvas.ucsd.edu/courses/48696/assignments/695553)	due by 11:59pm
	Lab Notebook (https://canvas.ucsd.edu/courses/48696/assignments/695557)	due by 11:59pm
	Final Comp (https://canvas.ucsd.edu/courses/48696/assignments/695555)	
	Final Part1 (https://canvas.ucsd.edu/courses/48696/assignments/695556)	
	Professionalism (https://canvas.ucsd.edu/courses/48696/assignments/695560)	
	Weekly Quiz 1 (https://canvas.ucsd.edu/courses/48696/assignments/695562)	
	Weekly Quiz 2 (https://canvas.ucsd.edu/courses/48696/assignments/695563)	
	Weekly Quiz 3 (https://canvas.ucsd.edu/courses/48696/assignments/695564)	
	Weekly Quiz 4 (https://canvas.ucsd.edu/courses/48696/assignments/695565)	
	Weekly Quiz 5 (https://canvas.ucsd.edu/courses/48696/assignments/695566)	
	Weekly Quiz 6 (https://canvas.ucsd.edu/courses/48696/assignments/695567)	
	Weekly Quiz 7 (https://canvas.ucsd.edu/courses/48696/assignments/695568)	