

Instructor: Lisa McDonnell lmcdonnell@ucsd.edu *I try to respond within 24 hours M-F.*
Office: York Hall 3080D, office phone: 858-246-0890

Office Hours: Beginning Week of Oct 2: Tues 12:30-1:30 York 3010, Thursday 10-10:50 York 3010

Lecture: Tuesdays/Thursdays 11am -12:20pm, Warren Lecture Hall.

Final Exam: Dec 13, 11:30am - 2:30pm.

Discussion sections: See schedule below.

Instructional assistants: See below.

Materials:

- iClicker is required for lectures and should be [registered on TritonEd](#).
- Textbook: Essentials of Genetics, Klug 9th edition, is an available textbook in the bookstore, but it is **not required**. I will provide readings that are sourced from free, online material. If you are comfortable with online resources, you can use the ones I recommend throughout the quarter. If you want a textbook then Klug is recommended, and you can find the relevant topics using the index/table of contents. You may also use older editions of the Klug textbook. We are **not** using mastering genetics.

Course Schedule: Condensed schedule at the end of the syllabus. More details will be provided weekly on TritonEd. Please check TritonEd site often for updates, deadlines.

Course website: <https://ted.ucsd.edu>

Discussion section schedule:

Section	Day	Time	Location		IA	IA email:
B01	M	8-8:50am	CENTR	220	Xin Yuan	xyh003@ucsd.edu
B02	M	9-9:50am	CENTR	220	Ashley	awdu@ucsd.edu
B03	M	10-10:50am	CENTR	220	Austin	ald011@ucsd.edu
B04	M	11-11:50am	CENTR	220	Aarthi	avenkat@ucsd.edu
B05	W	6-6:50pm	CENTR	203	Carmen	cmabad@ucsd.edu
B06	W	7-7:50pm	CENTR	203	Sorn	amudla@ucsd.edu
B07	W	8-8:50pm	CENTR	203	Sorn	amudla@ucsd.edu
B08	W	9-9:50pm	CENTR	203	Arthur	aih009@ucsd.edu
B09	F	2-2:50pm	HSS	1315	Anh	att045@ucsd.edu
B10	F	3-3:50pm	HSS	1315	Zong Ming	zchua@ucsd.edu
B11	F	4-4:50pm	HSS	1315	Terry	tsolomon@ucsd.edu
B12	F	5-5:50pm	HSS	1315	Terry	tsolomon@ucsd.edu

Welcome to BICD 100: Genetics! This course aims to develop concepts of genetics as they apply to how information is stored, utilized, and inherited in life. Fundamental concepts include gene and chromosome structure, phenotype, chromosome segregation and recombination, gene expression, random mutation, and natural selection. We will learn these concepts by studying their roles in biological systems and will apply our understanding of these concepts to explain and predict a wide range of biological and real-life phenomena including human health, biodiversity, and agriculture.

LEARNING GOALS

- **Collaborate** with fellow students and the teaching team to learn concepts in genetics
- **Apply knowledge** of genetics concepts to analyze & explain data, make predictions, and solve problems
- Learn to draw conclusions and **construct scientific arguments** based on evidence and reasoning

ACCESSIBILITY AND INCLUSION

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

Any student with a disability is welcome to contact us early in the quarter to work out reasonable accommodations to support their 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). 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. Whenever possible, we will use universal designs that are inclusive. If you have feedback on how to make the class more accessible and inclusive, please get in touch!

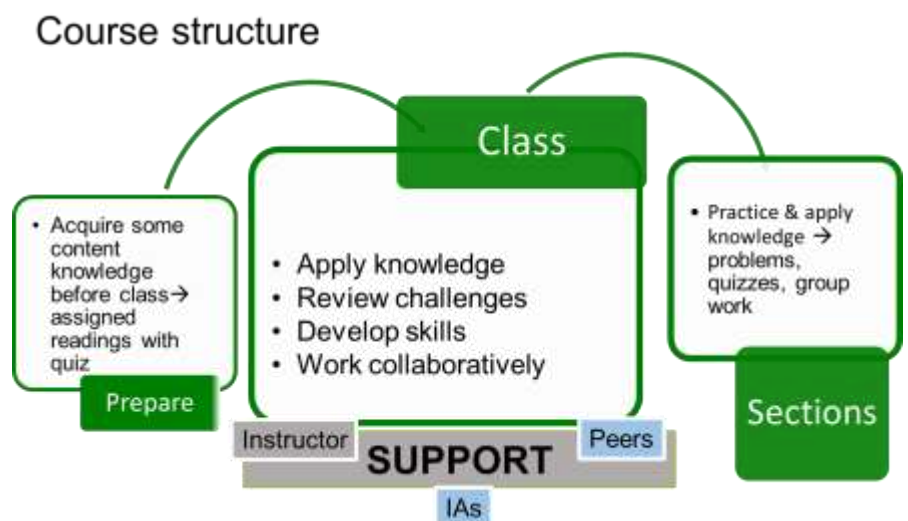
LEARNING IN THIS COURSE

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 in discussion section is expected. Being able to **communicate** understanding, and confusion, is critical to success in any discipline, and is very useful for learning¹. To encourage collaboration, class and section activities and discussions will be done in groups, and grades will not be assigned on a curve.

I use class time to work on applying our knowledge, troubleshooting difficult topics, and practice solving problems. There are often pre-class assignments to prepare for the material to come in class.

Instead of memorization, we will focus on developing an understanding of fundamental concepts as they apply to different examples. Therefore, quizzes will include questions that are based on solving problems in new contexts.

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



GRADING

BIMM101 has four grading components: participation (15%), midterms (25%), final exam (25%), writing assignments (25%), and professionalism (2%). Because different people may excel in different aspects, the writing assignments or final exam, whichever is higher for each individual, will be scaled to 33%, bringing the total to 100%. There will also be an extra credit opportunity (0.5%).

The following grading scheme will be used. The course is **not** graded on a curve (i.e. 20% of students getting A, B, C, and such). Thus, the ability to do well in this course is not dependent on others doing poorly. Because course assessments are not perfectly precise, grade cutoffs may be shifted slightly (e.g. by ~1%) from those listed below, based on large gaps in between individual scores.

A+	97-100%	B+	87-90%	C+	77-80%	D+	67-70%	F	0-60%
A	93-97%	B	83-87%	C	73-77%	D	63-67%		
A-	90-93%	B-	80-83%	C-	70-73%	D-	60-63%		

Participation: Active participation both in lectures and discussion sections is important for achieving the course goals. There will be many participation items, including pre-class reading assignments, in-class participation (iClickers, discussions and activities), discussion section problem sets and group work. Because individual students may have different competing schedules and life events, completing 85% or more of all participation items will earn the full participation. For example, if there are 40 participation items, completing 34 items will result in 40/40, whereas completing 31 items will result in 31/34 for the participation grade.

Pre-class assignments

Before most classes there will be an assigned reading and associated quiz, posted on TritonEd, to be completed before class. Reading will be assigned from online sources and primary literature. Check the weekly content folders on the TritonEd site for reading and quiz details and due dates. Pre-class reading assignments and quizzes are designed to 1) introduce some relevant background material, so you are prepared for class and can have productive discussions; 2) introduce some relevant primary literature; 3) your quiz responses help the instructor know what material students are struggling with.

In-class discussions: these will happen on a regular basis, and include iClicker questions and the occasional group-work activity. **Please note** that it is a violation of academic integrity policies to use someone else's iClicker in class. If you forget your iClicker you cannot make up the points (remember the 85% rule).

Discussion sections:

Sections will meet for the first time during Week 1, the week of Oct 2nd. Weekly discussion sections are designed to engage in collaborative problem solving, practice data analysis, and forming scientific arguments – all required for midterms and final exams (including collaboration, see below for more information on our collaborative midterms). For most sections some material will be posted for you to complete before you attend section. It is very important that you genuinely attempt the exercises before section so you can meaningfully contribute in section. Check TritonEd for section exercises. These will typically be posted on Thursday or Friday the week before section. Section exercises will be graded for thoughtful completion on a 0, 0.5, 1 scale, and part of your score will depend on participation in section.

You should already be enrolled in a section, and you must attend the section which you are enrolled in to receive credit. I am not able to change the number of students in a section, if a section is full you must choose another one.

A note about the role of the IA in discussion sections: the best way for you to learn how to solve problems and correct misconceptions is to work through the problem, and discuss the problem with your peers and the IA. The IA is not going to re-lecture material or simply give you the answers, rather they will use the time to facilitate collaborative problem solving.

Writing Assignments

There will be four writing assignments (6.25% each) focused on reading, understanding, and analyzing research data from primary literature articles. The first assignment will be an orientation to primary literature articles and academic integrity in general, and the other assignments will focus on drawing conclusions and constructing scientific arguments based on evidence and reasoning. There will also be a peer-review component for two of the assignments. Details of these assignments will be made available in class and on TritonEd.

The graded writing assignments will complement activities in class and in discussion section. The skills developed in these writing assignments will also be tested on midterm and final exams, where you will be challenged to analyze data and construct scientific arguments that answer specific research questions.

The Writing and Critical Expression Hub at the Teaching + Learning Commons located in Geisel Library (<http://commons.ucsd.edu/students/writing/index.html>) provides support for undergraduates working on course papers, e.g. writing assignments in this course, as well as other independent writing projects. Writing mentors can help at any stage of the writing process, from brainstorming to final polishing. The Writing and Critical Expression Hub offers: one-on-one writing tutoring by appointment; supportive and in-depth conversations about writing, the writing process, and writing skills; help with every stage in the writing process, walk-in tutoring; and workshops on writing.

Midterms & Final Exam: Tests in this course will focus on application of knowledge to assess and solve novel problems (**not** memorization of facts), and forming scientific arguments. Hence, tests will be open notes (e.g. paper notes, books, and calculators, but not electronic equipment that can be used to communicate with others). Midterms are cumulative but will focus on the most recent material, the final exam will include material from throughout the course. There will be two, 80-minute midterms held in class (midterm 1 – 10%, midterm 2 -15%) and one, 179-minute final exam (20%).

To facilitate reflection and learning from tests, our **midterms** will be a two-phase collaborative exam. The first phase will be done individually, and the second phase will be collaborative (in a group). The group score will be compared to the average of the group's individual quiz scores. If the group score is higher than that average, the difference between the group score and the average will be added to each person's individual score (to a max of 100%)

Example: Group consists of student A, B, C, and D.

Student A: 90% on individual Student B: 80% on individual

Student C: 70% on individual Student D: 60% on individual

Average of individual scores: 75%.

That same group gets 80% on the group quiz. Difference between avg individual and group = 5%.

Therefore, each individual gets an additional 5% on their scores, so the final quiz scores look like:

Student A: 95% Student B: 85%

Student C: 75% Student D: 65%

Why use this collaborative testing method? People tend to learn more from collaborative work compared to doing work alone^{2, 3}. These collaborative testing opportunities allow us to deepen our understanding because we are receiving feedback on our thinking in a very timely fashion (and feedback is critical for

learning). Also, it is an opportunity to practice communicating effectively and collaborating to solve problems.

2 Heller et al., 1992. http://www.physics.emory.edu/faculty/weeks//journal/Heller_AJP_91a.pdf

3 Gilley and Clarkston, 2014. http://www.cwsei.ubc.ca/SEI_research/files/Gilley-Clarkston_2-Stage_Exam_Learning_JCST2014.pdf

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. 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 individual (2% described here) and community efforts (0.5% extra credit described below). The individual component is to account for demonstrating maturity and 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 one-on-one interactions, electronic communication, and follow-up conversations on grades, your professionalism credit may be deducted in steps of 0.5%.

Example interactions with meaningful benefits:

- Developing deeper insight into course material, concepts, biology, and/or society in general
- Working collaboratively to improve in skill building and future opportunities
- 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

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

- Contributing inequitably to team work in class, in discussion section, or on exams
- 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
- Ignoring the directions or requests from the instructional team
- Being disruptive to fellow students in class, in discussion section, or on exams

Extra Credit: The 0.5% extra credit is for community professionalism and can be earned by completing course evaluations and related surveys which aim to improve the course and the educational experiences of your future peers. If 90% or more of all students complete CAPEs, instructional assistant evaluations, and other course-based evaluation surveys in a mature and professional fashion (i.e. taking them seriously and providing timely and constructive feedback), 0.5% will be awarded to everyone in the course. Other than the community professionalism, there are no other opportunities for extra credit beyond what is assigned by the course instructor.

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 (<http://www.academicintegrity.org/icai/home.php>) and Tricia Bertram Gallant Ph.D., which serve as the foundation for academic integrity. These values include:

	As students we will.....	As the teaching team we will.....
Honest	<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

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 suspected instances of a breach of academic integrity will be reported to the Academic Integrity Office for review. This includes writing papers, taking tests, use of iClickers, completing homework problems, etc.

LATE ASSIGNMENTS AND QUIZZES

No late participation items will be accepted, as completing 85% of all the participation item will earn the full participation grade. No late writing assignments or discussion section activities will be accepted, and no make-up exams will be offered, except in the case of a documented short-term illness or serious family emergency. In this case, please contact Dr. McDonnell as soon as possible or reasonable to do so.

REGRADES

If a grading error has been made, you should submit a re-grade request to Dr. McDonnell at the end of a lecture within one week of the return of the exam. Attach a cover-sheet to your regrade request, indicating the specific details of the request. If you think your answer deserves more points (e.g. it is not an arithmetic error), your cover-sheet should contain a concise description of how your answer compares to the key, and why you think it should have received more points. Regrades will not be done if these instructions are not followed. No regrades are possible for exams written in pencil or non-permanent ink. Students who submit exams for re-grading understand that we may (1) regrade the entire exam, and (2) compare the submitted paper to a scanned copy of the original exam.

LECTURE PODCAST

<http://podcast.ucsd.edu/>

Whenever possible, lectures will be recorded and available online as videos as a resource for review. However, attendance and participation are highly encouraged, as substantial portions of lectures will be interactive. Please see participation in the grading section for more details.

TECHNOLOGY POLICY:

Laptop computer policy: Students are welcome to bring laptops to lecture for note-taking purposes. Please see this research study that shows “multi-tasking” on computers is not only likely to decrease your grade, but the grades of people around you who can see your screen!⁴ For this reason, we ask that you do not flip between lectures notes and the internet, unless as part of an in-class activity. The use of cell phones, computers, or any other electronic devices is not permitted during exams. Use of a cell phone or other similar electronic devices during an exam is grounds for receiving a failing grade.

⁴ Sana et al. 2013. <http://www.sciencedirect.com/science/article/pii/S0360131512002254>

CALENDAR

More specific details for each week, including pre-class reading assignments/quizzes, will be provided on TritonEd. We may also adjust the schedule as necessary, while still focusing on the foundational concepts.

Week	Topics	Assignments due *most weeks there will be pre-class reading assignment/quiz due Monday 11:59pm on TritonEd. Check TritonEd for details and times/dates due.
0 (Thursday Sept 28)	Intro & two-stage review	
1	Chromosomes, genes, mutation	Syllabus quiz on TritonEd, due Monday 11:59pm
2	Mutation & phenotype & dominance	Writing assignment #1 due Sunday 11:59pm
3	Replicating cells, making gametes, inheritance	Complete peer-review calibration pre-test
4	Tuesday Oct 24 - Midterm 1 Gene Interaction & Complementation	Writing assignment #2 due Sunday 11:59pm
5	Complementation, genetic linkage, molecular markers	Calibration & Reviews of assignment #2 due Sunday 11:59pm
6	Continue linkage SNPs, GWAS	*Veteran's Day Friday Nov 10 = Friday discussion sections attend others or reschedule with IA
7	GWAS, quantitative traits, selection	
8	Tuesday Nov 21 - Midterm 2 No Thursday Class - Thanksgiving Holiday	No discussion sections this week. Writing assignment #3 due Sunday 11:59pm
9	Somatic Mutations & Cancer	Calibration & Reviews of assignment #3 due Sunday 11:59pm
10	Genetic editing Ethical considerations of personal genomics with Dr. Cinnamon Bloss	Writing assignment #4 due Sunday Dec 10 11:59pm
Finals	Final Exam	Wed Dec 13th, 11:30am-2:29pm