

Bi214 General Biology IV: Mechanisms

This course is about how stuff works: the mechanisms by which biological processes, practiced by all cellular life, operate. Through a combination of lectures, problem solving, and laboratory exercises we will explore amino acid chemistry, the structures and functions of proteins, the genetics of biochemical pathways, the structure and regulation of prokaryotic and eukaryotic genes, and the genetics and molecular biology underlying development. Bi211 and Bi212, or the equivalent, and a full year of General Chemistry are prerequisites.

Contact Info:

Instructors	Email	Instructors	Email
Dr. Amy Connolly (Instructor)	amyc@uoregon.edu	Sarah Acker (BTU)	sacker@uoregon.edu
Kayla Evens (GE)	kevenc@uoregon.edu	Starla Chambrose (BTU)	starlac@uoregon.edu
Stephanie Ostresh (GE)	sostresh@uoregon.edu	Clara Rehmann (BTU)	crehmann@uoregon.edu

12:00 Kayla Klamath 21	Sarah
3:00 Kayla Klamath 21	Starla
12:00 Stephanie Klamath 13	Clara
3:00 Stephanie Klamath 13	Clara on Tuesdays and Sarah on Thursdays

Class Time: 129 McKenzie (MTWH 9:00-1050).

Tutor/TA Time:

Please see Canvas office hour page for updates or changes.

All office hours will be in Klamath 32

Monday

11:00-1:00 Kayla
3:30-4:30 Stephanie (Except on Labor day; make up time Friday August 30th, 9:00-11:00)

Tuesday

11:15-12:45 Dr. Connolly: (will prioritize questions from 12:00 labs prior to 12 pm except for first Tuesday)
3:00-4:00 Sarah

Wednesday

11:00-12:00 Stephanie (Except on September 4; make up time Friday August 30th, 9:00-11:00)
12:00-1:00 Clara

Thursday

11:15-12:45 Dr. Connolly: (will prioritize questions from 12:00 labs prior to 12 pm except for last Thursday)

Friday

12:00-1:00 Starla (except on August 30th, make up time will be 1:00-2:00 on that day)

Required Supplies

1) Customized text book:

- The required book is a customized text that incorporates material from *Biochemistry* (Mathews, et al., 4th ed.), *Molecular Biology of the Gene* (Watson, et al., 7th ed.), and *iGenetics* (Russell, 3rd ed.), and includes original material. The general text used in Bi211-213, *Biological Science* (Scott Freeman), may be helpful, but is not required. If you have *Biological Science* in your possession you may want to keep it as a reference book; however, I do not recommend that you purchase Freeman's book solely for this course.

2) Laboratory manual:

- This can be purchased at the UO Bookstore. If the UO Bookstore is out, you must request an order, and they should be able to get you one promptly. We will not have copies available in lab or on reserve in the Science Library.
- Note that it is your responsibility to order these; we will not have copies available in class or lab

3) Workbook

- This can be purchased at the UO Bookstore.

4) Scientific Calculator

Grading

The breakdown is below:

Exam 1	25%
Final exam	35%
Lab Reports (6 with lowest one dropped)	15%
Lab Quizzes (5 with lowest one dropped)	25%

Grade Breakdown and Determination:

A+	A	A-	B+	B	B-	C+	C	C-	D	F
98+	93-97	90-92	87-89	83-86	80-82	77-79	73-76	70-72	60-69	59-

Final grade determinations may not follow the above scale as it will depend upon where there are natural breaks in the total class scores and how the class is fairing as a whole. **However your grade will never be lower than the above grading scale.** For example, an 80 will always earn you at least a B-, but a 79.5 in the class, could earn you a C+ or a B-, it will just depend on how where the natural cut offs lie.

This class is challenging and there may be low averages on exams or quizzes. I will not curve individual exams or quizzes. If there are low scores my goal is to work with the class to improve the next assessment (without compromising rigor), and hopefully the next assessment will be higher. At the end of the term I will evaluate the class as a whole, compare to other terms and reflect upon how the course ran in general. I will take these factors into consideration to

determine whether the grading scale is appropriate for this particular class, and may decide to adjust it. But the best way to succeed is to not rely on a curve. As mentioned above, I will never shift the grading scale so that you get a lower grade than the guidelines above. Challenge yourself by using the above grade breakdown as your guide. **After Exam 1, I will post a current prediction of where you are currently standing in the class. After the final I do not publish grade cutoffs, so do not ask what they are. Additionally, at the end of the term, please do not ask for your grade to be bumped or for opportunities for extra credit. Your request will play no role in the decision making, so please do not ask.**

Grading Policies:

Make-up and early exams will not be offered except in rare situations (such as a medical or family emergency). If an emergency comes up it is your responsibility to contact the instructor ASAP. If you need to miss a/the midterm, then the other exams (just the final exam for summer) will be weighted more heavily. **There may not be an opportunity for you to make up labs or lab quizzes.** Labs are typically full and contain the number of people permitted by fire code rules. We are required to follow these rules, which means students cannot show up to other lab unless there is space. This is why ultimately you have one lab report and one lab quiz dropped, to allow for those special circumstances that come up where you may need to miss. You may be able to join another lab, but you have to communicate with the GEs on this, and they may tell you it is not possible.

UO Club sports events do not qualify for exceptions.

All exams and quizzes must be written in pencil; use an eraser to remove mistakes and unnecessary writing. Exams and quizzes are graded on the correctness of the answer for which the question is asked, and on correctly followed directions. Exams will not be handed back. There will be a special office hour held where you can review your exam. Quizzes and reports will be returned. Quizzes will be taken at the beginning of lab. All exams, quizzes, and reports with grading errors must be returned to the GE (reports and quizzes) or me (exams) **within one week** of your receiving the graded assignment for consideration, and must be accompanied by a written explanation. **For summer sessions, requests for regrade on work returned in the final week must be submitted to the GE no later than noon on Thursday. Absolutely no requests will be taken during dead week in the normal school year.** Requests for your instructor to look over an answer without a specific identified grading error will not be considered. *The entire exam, quiz, or report will be reviewed.*

Problem sets will not be turned in for grading. However, working the problems will be your best form of preparation for the exams and quizzes, so you are encouraged to make a sincere effort in solving them. Problem set answers are posted on Canvas.

Laboratories

Laboratories begin on Thursday of the first week. We will do a total of 6 laboratory exercises. The exercises, background information, and report pages are contained within the lab manual. You must read the material BEFORE coming to your lab. Details of the lab format, assignments, and grading are included in the lab manual. This course is full, so you may not be able to switch lab sections if a conflict arises for you in a given week. Labs begin on time with a lab quiz at the

start. If you are late you will miss out on quiz time. You must fill out the preparation questions in your lab manual before coming to lab.

Late Policy on Lab Reports: With the exception of Lab 5 and Lab 7 (see syllabus), your lab reports are due at the start of your following lab. In order to not be docked late points, lab reports must be turned in on time. Reports that are turned in late will receive an automatic ½ off. Lab reports assigned in the first two weeks of summer session will not be accepted past 2 weeks of when you performed the lab. Late lab reports assigned in Week 3 and 4 will not be accepted past 12:00 pm on Thursday September 12. You may not miss a lab and then turn in a completed lab. Those reports will receive a 0.

Course website

We use Canvas for the course website. On the site you will find the syllabus, lecture and lab schedules, staff e-mail contacts and office hours, problems set answers, course and lab announcements, supplementary reading, and grade access.

Accommodations for students with disabilities

If you have a documented disability and anticipate needing accommodations in this course, please make arrangements to meet with me as soon as soon as possible. Please bring a notification letter from the Accessible Education Center stating your approved accommodations.

Class conduct and academic honesty

Class starts promptly at 9:00 and ends at 10:50. Please arrive on time and do not pack up before the conclusion of the lecture. Arriving late and leaving early is disruptive to others around you and to the speaker. Do not talk during lecture in a volume audible to anyone but the intended recipient.

Personal computers and cell phones will not be allowed in lecture or lab. However, flat electronic devices that you write on like a notebook are acceptable. If you have a requirement for using a computer to take notes, please make accommodations with me on the first day of class. Your use of the computer may be monitored by a teaching assistant.

All work submitted in this course must be your own. Instances of suspected cheating or plagiarism on exams, quizzes, and reports will be referred to the Office of Student Conduct and Community Standards. Your instructors take these cases seriously. Academic misconduct could result in a failing mark for quiz, exam, report or for the course. For definitions of violations, a description of the hearing process, and a summary of penalties for findings of academic misconduct, go to <http://policies.uoregon.edu/vol-3-administration-student-affairs/ch-1-conduct/student-conduct-code>

Class Schedule

Date	Topic	Readings
Week 1		
M Aug 19	Introduction, Amino acid structure	1-11
T Aug 20	Acid-base chemistry; Acid-base properties of amino acids <i>*Bring Calculator</i>	12-28
	No Lab	
W Aug 21	Acid base chemistry for Triprotic amino acids and polypeptides; Begin protein structure <i>*Bring Calculator</i>	29-34
H Aug 22	Protein Structure: Secondary	35-40
	Lab 1: Amino Acid Chemistry Bring Amino Acid cards to class Quiz 1 Content: <ul style="list-style-type: none"> Prelab of Lab 1 Workbook: Section 1; Section 2: 1-3, 7-9 	Complete Lab Prep
Week 2		
M Aug 26	Protein Structure: Tertiary and Quaternary;	16, 41-46
	Intro to Hemoglobin	46-51
T Aug 27	Hemoglobin Cooperativity and Allostery	51-64; 72-75
	Lab 2: Protein Structure Quiz 2 Content: <ul style="list-style-type: none"> Lab 1 All Amino Acids and pK_as of ionizable side chains should be memorized by this point Prelab of Lab 2 Workbook: Section 2, Section 3: 1, 5, 8 	Complete Lab Prep
W Aug 28	DNA Structure; DNA Mutations	77-78, Table on 80, 81, 87-106
H Aug 29	DNA Mutations continued; If time, we will begin Metabolic Pathways	Complete above reading if you haven't finished it
	Lab 3: Hemoglobin Lab 4: Abbreviated: DNA Structure Quiz 3 Content: <ul style="list-style-type: none"> Lab 2 Prelab of Lab 3 and 4 Workbook: Section 3, Section 4: 1, 2, 8-11, Section 5: 1-5 Be able to recognize what nucleotide you are looking at and know Hydrogen bonding patterns between base pairs 	Complete Lab Prep
FRIDAY Aug 30	Review Session 3:00-4:20 in 240A McKenzie Hall	
Week 3		

M Sept 2	LABOR DAY	
T Sept 3	EXAM 1 Content is through August 29 th ; Section 1-Section 5 in workbook	
	Lab 5: Mutagens Lab 5 report due Monday 9/9 at Noon in GE box No quiz Friday Return: You will have a 3 day incubation for the three activities, which will have you coming back on Friday September 6	Complete Lab Prep
W Sept 4	Metabolic Pathways, Conditional Mutants	107-113
H Sept 5	Complementation Tests	
	Lab 6: Complementations Quiz 4 Content: <ul style="list-style-type: none"> • Lab 5 (Ames test concept, experimental design) • Lab 6 Pre-lab • Workbook: Section 6:1-4 You will need to return to lab <i>twice</i> . First return: Return on <u>Friday</u> to complete Activity 2 step 5; Activity 3 step 6 and 7. Second return: Monday: Activity 3 step 8	Complete Lab Prep
FRIDAY Sept 6	Lab will be open from 9:00-4:00 for you to complete steps from Lab 5 and Lab 6. Faculty will mostly likely not be present, so make sure you know what you are supposed to be doing during your lab that week. Only one person from each group needs to return.	
Week 4		
M Sept 9	Transcription in Prokaryotes; Lac Operon: Negative regulation	114-124 124-137
	You will need to stop by lab for second return of Lab 6. Lab will be open 11:00-4:00	
T Sept 10	Lac Operon: Positive regulation	137-140
	Lab 7 : Gene Regulation <i>Lab 7 report due Wednesday by noon in your GE's box.</i> Quiz 5 Content: <ul style="list-style-type: none"> • Lab 5 (Result Analysis) and Lab 6 • Workbook: Section 6; Section 7: 1-2 • Nothing on Lac Operon; Nothing for Prelab for Lab 7 	Complete Lab Prep
W Sept 11	Cell Polarity and Development; Asymmetry in Yeast	141-146
H Sept 12	Asymmetry in Yeast	146-150 Chang and Drubin*
	No Lab Review Session at 3:00-4:50 in 240A McKenzie Hall	
FRIDAY Sept 13	FINAL (cumulative) All class and lab content; all workbook problems	