COURSE GUIDELINES & POLICIES

Molecular Biology & Genetics (Biol 202.008) Fall 2019
9:05-9:55am in Genome Sciences Building 200

Course Goals

Complete learning objectives are listed on the final page of this document.
Generally speaking, my goal is to create opportunities for you to…

1. Master the core principles of Genetics and Molecular Biology
2. Gain higher-level critical thinking skills and develop your skills as a scholar
3. Discover excitement about basic science and its applications

Prerequisites

BIOL 101 and CHEM 101, with a grade of C or better

Your Instructor

Title: Dr. Zwemer or Dr. Z
Email: lmzwemer@ad.unc.edu (preferred) or limerriam@gmail.com (permanent)
Please **do** feel free to find me on LinkedIn
Please do **not** find me on Facebook/Instagram. Thanks!
Office hours: Mon, Wed, Fri 10:30-noon Wilson Hall Room 237 or by appointment

Your Graduate TAs

Kayla Goforth kaylago@live.unc.edu
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Your Supplemental Instruction Leaders

Sarah Friday sarahfri@live.unc.edu
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Your Peer Mentors

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Course Website

Course information can be found on the Sakai site. If you have a question about the course, please ***first check the website and look at the class schedule*** for information about class topics, assignment due dates, and general policies. Teaching and learning are dynamic processes. In order to adjust to the real-time needs of the class, **changes may be made mid term in the assignments and content of the course**. If such a need arises, I will take care to notify you of these changes as soon as possible.

Email

You have each been furnished with an @unc.edu email address. You are required to check this email address at least once every 24 hours in case I need to send out essential last-minute information. I will respond to all emails within 36 hours of your sending them. Please remember to be courteous and professional in your emails, for example by using a subject line, an opening greeting, and a closing signature that includes your name.

Textbook

Klug *et al.*, Essentials of Genetics 9th edition.

This e-text comes with a web-based software package called **Mastering Genetics** that will be the platform through which **you will be quizzed and receive short pre-lecture and post-lecture assignments.** Learning Catalytics, our classroom response software, is included too, as is the interactive e-book (our textbook). If you also want a physical copy of the textbook, you can purchase one from the Bookstore for an additional $48.

Either way, you **must** purchase the Pearson access code to complete this course. While the national retail price for the access code is $119.99, the cost of the access code through the UNC Student Store's Digital Delivery Program is $92.10. To purchase the access code from the UNC Student Store's Digital Delivery Program, check your official UNC email address for an email from the sender digitaldelivery@unc.edu. This email should arrive before classes start. It contains an individual, unique Pearson access code that is specific to our class. This code is live and can be used immediately (before payment, with a two-week grace period). Students will have until **August 28th** to opt in to charge their student accounts for the access. To opt in, they need only to reply "opt in" to the email they received. After paying, they can continue to use the code provided. If a student chooses not to opt in, their unique access code will be de-activated and the student will have to buy access separately.

After you enroll in Mastering Genetics, find the course using these codes:
Course name: Biol 202 FALL 2019 ZWEMER Course code: zwemer73558

Copyright and Intellectual Property:
Please be aware that all materials used in this course, including: notes; slides; practice problems; homework assignments; recitation assignments; and exams, are covered by copyright protection, which forbids you from sharing class materials with any outside individuals or groups. This intellectual property may not be shared with others outside the class without formal, written approval from the course instructor and the UNC Department of Biology.

So, You Want to Succeed?
As your instructor, I will do everything I can to facilitate a productive, supportive, and engaging learning environment, but the rest is up to you. It's my job to create opportunities for you to learn, but it's your job to do the actual learning. **This is NOT a class for passive learners. You are expected to be actively engaged in this course through class discussions, class activities and pre- as well as post-lecture assignments and readings.**

The material for the course will presented from prepared slides, which are NOT sufficient by themselves, so students are **expected to print the course outlines from Sakai before class, bring them to class to take notes on them**. Educational research has shown that students engage more fully with the material when they take notes by hand (Psychol Sci. 2014 Jun; 25(6): 1159–1168); this practice allows you to process the information in real time, analyzing and synthesizing the information right away as you determine how the concepts related, and identifying any questions about the material in real time. Make note of your questions and ask about them in real time. If you seem lost, you are not alone, but you may be the only one brave enough to admit it. Help your colleagues out by asking the questions that they might be too timid or embarrassed to ask.

If you are accustomed to typing notes, or to simply transcribing lectures verbatim, it may feel cumbersome and difficult to figure out how much to write down and what to write down – that's because making those decisions is actually the first stage of learning. To decide what to take notes on, ask yourself:

"What is the main point of this slide?" *"How does this information relate to the previous slides?"*
"Why is this specific information being presented to me?" *"Is there anything confusing to me about this concept?"*

I'm happy to meet during office hours to help you learn the art of scientific note taking, which may be unfamiliar to you, or to review material that you are still unclear on. Additionally, reviewing notes with a classmate is a fantastic way to help you fill in any details you may have missed, to test your comprehension, to build your science communication practice, and of course to build friendships and have fun! Please do not simply take photographs of the slides. Post-lecture slides will be posted to Sakai.

The course is composed of three class meetings and one recitation session each week. It is expected that you will spend at least two hours reading and working problems associated with **each** of these four weekly

meetings. If you stay on top of your reading and homework, there will be no need to cram for an exam (which is good, because cramming doesn't work very well for this kind of material). **Practice, practice, and practice more,** reviewing your notes frequently, testing yourself on the concepts (use the internet or other textbooks in the library to find more problems if you run out from your textbook), and working with your classmates in study groups. Always remember that you are the only one who controls your success in this course, regardless of what your shape your goals take.

We are here to help you, but you have to be proactive about your academic success. You are expected to visit **Peer Mentor** and **Supplemental Instruction** sessions routinely (see below). Don't wait until there is an issue – you should attend these sessions regularly to go over the slides, work through practice problems, and challenge yourself to apply the material (not just understand it). Bring a buddy if you like!

You are responsible for checking the schedule for all recitation pre-work, course reading, Mastering Genetics, and additional homework assignments, organized by their due date. If you find yourself falling behind, or having trouble staying on top of the many moving parts of this course, please use Sakai to schedule office hours with me. Time management is an essential skill that sometimes requires a bit of help to develop.

Finally, take your time completing Mastering Genetics Assignments. These assignments are an easy way to earn (or lose) up to 10% of your total grade (and they are a great way to learn the material – check on the Study Area!). Take your time as you complete the MG assignments, and don't just guess. Read the e-text, watch the online videos, and open the hints to try to make sure that you understand the answer choices.

Recitations

During recitations, Graduate Teaching Assistants will lead you through activities or problem-solving practices. This course is a 4 credit hours course, and the recitations are not simply "going over the material that was learned in class", but rather count as a **core, and required, component of the course**. Some of the material covered in recitations will be supplemental to the topics discussed in class.

Supplemental Instruction

At least two times a week, we will offer supplemental instruction (SI) sessions (schedule will be posted to the Welcome Page of Sakai). The sessions will be led by undergraduate students who excelled in this class in a previous semester. The SI sessions will allow you to process and actively practice material that was taught in the previous week. Past students have referred to the SI sessions as one of the most significant tools that improved their learning.

Peer-Mentoring

Several of our best students who excelled in this class in the past will serve as peer mentors. They will be present in class and assist during class activities as well as offer weekly one-on-one mentoring sessions (schedule will be posted to the Welcome page of Sakai).

Assignments

During the semester you will have **pre-class, in-class, and post-class homework assignments**.

- The pre-class assignments will be based on **assigned readings from the textbook**. The assignments will be given via the **MasteringGenetics** system (see above).
- In-class assignments will include **Learning Catalyics** and other activities.
- Post-class assignments will include **MasteringGenetics** and occasionally **Written Homework Assignments**.

All assignments due dates appear on the detailed schedule document; revisions to this schedule will be announced on Sakai. **You are responsible for submitting the assignments on time.** Late work receives a grade of 0; there will be no "second chances"

The guided reading questions (GRQs) are available for you to complete and I strongly suggest that you do so. They guide you through the reading, training your attention on the most relevant points and challenging you to apply the information. You will not be submitting these answers for grading, however. Regardless of whether or not you plan to answer the GRQs, check the GRQ documents for detailed information about what pages of the textbook to read to prepare for class, and the occasional website pre-reading assignments.

Learning Catalytics (LC)

Part of your grade (see details below) will come from a program called Learning Catalytics that you use through your laptop or mobile phone. We will use this for both attendance taking/participation and for active learning. Note - missing just a couple of classes can quickly affect your participation grade! See Sakai for the required registration and troubleshooting information. You must be connected to the University wifi ("Eduroam") https://sils.unc.edu/it-services/personal-computer-faq/wireless in order to use and get credit for Learning Catalytics – you cannot use your own phone's cellular data. If you need help with LC- check out the Pearson support page:
https://help.pearsoncmg.com/learning_catalytics/student/mx_stud/Topics/lc_looking_for_help.htm

Piazza

We will use an online platform called "Piazza" this semester. You may post any questions that you have about the course to this site at any time and they will be answered by either a fellow student, a mentor, or me. Your questions may be more general and may relate to the course itself or they may be more specific and instead relate directly to content and/or material from class. In any case, Piazza will help you get them answered ASAP.

Please be courteous, take time to explain your questions or comment clearly, and read through prior posts to see if your question has already been addressed. You also should not post anything unrelated to the class in Piazza. No personal attacks or usage of offensive language will be allowed. No posts that directly give the answers to assignments are allowed - for instance, "The answer to #5 is C". That being said, you are allowed to ask questions concerning the assignments, and your classmates are allowed to respond, as long as the conceptual framework is being discussed.

Grading

Your final for this course will be determined as follows:

Assessment	**% Contribution**
Exam 1	18
Exam 2	18
Exam 3	18
Cumulative Final	18
Mastering Genetics Assignments & Mastering Genetics Quizzes	10
Recitation & Open-Ended Homework	10
Learning Catalytics	8

Letter grades will not be assigned for individual exams, only points. Final semester letter grades will be assigned on the total number of points for the entire semester: A 93-100; A- 90-92; B+ 87-89; B 83-86; B- 80-82; C+ 77-79; C 73-76; C- 70-72; D+ 66-69; D 60-65; F <60

Please note that grades will not round up (e.g. B= 83, NOT 82.96)

The instructor reserves the right to make changes to the syllabus, including lecture topics, assignment due dates and test dates. These changes will be announced as early as possible and revised version of the schedule will be posted to Sakai (revision dates are included in the header/footer of the document).

Absences

Students are expected to arrive on time and participate in both class meetings and recitations. If you know that you cannot attend class, please plan to get notes from a classmate right away, and also plan to meet with a peer mentor and/or supplemental instruction leader to go over what you have missed. Please note that even if you are absent, you will still be responsible for turning in any If you cannot come to class for more than two days, you will need to meet with me to discuss the situation. While the course follows the textbook, some of the material discussed in lecture may not be found in the text. **You are responsible for all material and announcements made in lectures**. You are not responsible for textbook material that was not covered in class, unless it was specifically assigned (see schedule document for assigned readings).

Exams must be taken on the dates indicated; no makeup exams except in special circumstances, i.e. medical or family emergency as documented in writing. If you are ill on the day of an in-class assessment, you will be issued a make-up assessment that is more challenging than the original.

There will be **no make-up opportunities for in-class recitation assignments** if you have an unexcused absence. If you have a documented medical emergency or a truly unavoidable absence (e.g. family wedding or funeral), it is your responsibility to contact your TA as soon as possible, but no later than within 24-hours of the scheduled recitation to discuss the possibility of attending a make-up session. There is a maximum capacity for each section so please do not assume that you can simply attend another section if you miss a recitation.

Additional information can be found here:
https://catalog.unc.edu/policies-procedures/attendance-grading-examination/#text.

Academic Integrity

All activities and homework in the class is expected to conform to the standards summarized by the UNC Honor System and explained by the UNC Office of Student Conduct https://studentconduct.unc.edu/. There are times when we all struggle to do what is right or to find a way out of a stressful situation. Most violations are not due to ill intent, but to either ignorance or desperation. If you find yourself falling behind or struggling and are tempted to violate the honor code, **please simply come to me directly** so that we can come up with a plan forward. Policies around plagiarism can be confusing to students. Many violations that I have seen are due to ignorance of the policy or lack of skill in this area, and would be completely avoidable if the student had been proactive about getting help or clarifying their questions.
https://writingcenter.unc.edu/tips-and-tools/plagiarism/

It's very important that all work submitted be your own original work. This means that you may not simply "borrow" or "copy" phrasing from your classmates, even when doing group work. For example, when working on a handout in lab, splitting up the questions and copying answers from one another, rather than working together, is a form of cheating. I am a big fan of group work, but it's essential that each person takes the time to really understand the concepts and then express the answers in their own words. I appreciate that it can be hard for some students to understand **the difference between group work and cheating** (especially if they have learned different standards in high school) so please do not hesitate to ask me for help if you want to be sure you understand correctly.

If you need to paraphrase an idea from a published source, please provide a proper citation. Learning when and how to properly cite material as well as how to avoid plagiarism are not as simple as they sound – please don't hesitate to reach out for help in developing these skills.

On exam days, you will be asked to sign a written commitment to neither lie, cheat, nor steal in your academic endeavors, nor to accept the actions of those who do. Please note that many of the assignments and activities we will use are the original work and intellectual property of the UNC Biology faculty. It is a violation of copyright law (and also, quite simply, poor form) to share these materials without the explicit permission of the department.

If your work is suspected to have violated the Honor System standards, or it is suspected that you have assisted another student in violating the Honor System standards, then I am required to file a formal report to the University Honor Court (https://studentconduct.unc.edu/report-violation-office-student-conduct). In addition to whatever formal procedures are set forth by the University, you may fail the assignment.

Accessibility Resources

The University of North Carolina at Chapel Hill facilitates the implementation of reasonable accommodations, including resources and services, for students with disabilities, chronic medical conditions, a temporary disability or pregnancy complications resulting in difficulties with accessing learning opportunities. Students who wish to record the course in any way (audio or photographic) must work with the Accessibility Resources and Service Office to file the proper paperwork and then reach out to me directly.

Although I am very happy to help and want to support all of my students to succeed, it is your responsibility to get the appropriate documentation filed and to approach me about your needs. All accommodations are coordinated through the **Accessibility Resources and Service Office**. See the ARS Website for contact information: https://ars.unc.edu or email ars@unc.edu. Relevant policy documents as they relation to registration and accommodations determinations and the student registration form are available on the ARS website under the About ARS tab.

Letters of Recommendation

If you feel that by your participation in this course you have contributed to creating a rich learning environment that has enabled you and your classmates to grow as scholars and scientists, then I would be happy to write you a short letter or recommendation for your own use. If you think you will need this letter, please ask me either during the term or no later than 1 week after the conclusion of the course so that I may draft the letter while my recollections are still fresh. I will furnish you with a list of questions to answer, which will guide me in writing you the strongest possible letter.

Course Learning Outcomes

Upon completion of the 202 course in Biology, a student should be able to…(Skills):

• Build hypotheses to answer a specific scientific question, design an experiment using an appropriate technique/assay to answer the question, and predict results of their experiment.

• Give examples of how advances in genetics and molecular biology, from the discovery of DNA's structure to sequencing individual genomes, have changed the world (examples include recombinant insulin, personalized medicine, transgenic crops)

Upon completion of the 202 course in Biology, a student should be able to…(Concepts):

• Explain the term "allele" for a single gene at a population, organismal, cellular, and molecular level; explain how dominance and recessiveness are expressed at these levels.

• Model the generation of genetic variation comes in a population (e.g. meiotic recombination, independent assortment of chromosomes in gametogenesis, and mutation)

• Predict genotypic and phenotypic ratios of offspring resulting from genetic crosses, or the reverse (when given data about offspring, determine the genotypes and phenotypes of the parents).

• Deduce modes of inheritance (example: autosomal dominance, X-linked recessive) from genetic pedigrees and explain how incomplete penetrance and variable expressivity complicate these analyses.

• Distinguish monogenic and polygenic traits. Explain the influence of the environment on phenotypes.

• Explain how DNA is replicated normally and abnormally in the cell and outline how these concepts are utilized in the polymerase chain reaction (PCR).

• Compare and contrast the consequences of various types of germline errors during meiosis (such as non-disjunction, and translocations) and somatic errors during abnormal mitosis (such as non-disjunction and errors in replication)

• Explain the flow of genetic information, based on the central dogma- from DNA to proteins and how mutations are carried through this flow of information.

• Describe the nature of the genetic code and the influence of mutations on the code

• Describe the general organization of prokaryotic and eukaryotic genomes, including the identity and significance of the different parts of a gene (e.g. regulatory/non-regulatory, exons/introns; transcription start site; translation start site; UTRs)

• Explain transcriptional and post-transcriptional regulation of regulation as well as their use to modify expression in different conditions (e.g. environmental, developmental, or in disease states)

• Predict the experimental outcomes when modified genes are used (e.g. GFP-tagging to investigate gene expression)

• Describe the basic steps in gene cloning (restriction, ligation, selective screening, etc.)

• Design an experiment to produce a transgenic animal/bacteria, where a protein of interest is specifically produced

• Explain the value of basic sciences research using model organisms to elucidate fundamental biological phenomena.

Biology 202_008 Schedule of Lessons and Assignments

Note that this schedule is subject to change at the discretion of the professor to suit the needs of the class. (18Aug2019)

Detailed information on each day's topic and the corresponding pre-work can be found on the "Lessons" tab of the Sakai site:

- These include Pre-work readings, "Open-ending Homework", and Mastering Genetics assignments, are of which all required and must be completed prior to 8am on the due date.
- Guided reading questions (GRQ) are **very** strongly suggested and will have a very positive impact on your learning, but these will not be submitted for grading.

Date	Lesson	Topic
(8/19-8/21) NO RECITATION		
Wed 8/21	1	Introduction to the course and overview of genetic information
Fri 8/23	2	How genetic information is **stored** in the genome
Recitation #1 (8/26-8/28): Introduction & Overview		
Mon 8/26	3	How genetic information **flows** from DNA to RNA to protein
Wed 8/28	4	Variation in genetic information – from genotype to phenotype
Fri 8/30	5	Variation in genetic information – SNPs and personalized medicine
(9/2-9/4) NO RECITATION		
Mon 9/2	*Labor Day Holiday - No Class*	
Wed 9/4	6	Process of Science: Discovery of the structure and function of DNA
Fri 9/6	7	Process of Science: Discovery of how DNA replicates
(9/9-9/11) Recitation #2: A Right to her genes: BRCA cast study		
Mon 9/9	8	How genetic information is **transmitted** *in vivo*
Wed 9/11	9	How genetic information is copied *in vitro*
Fri 9/13	10	How genetic variation arises by mutation Pt 1 (Types)
(9/16-9/18) Recitation #3: PCR and DNA "fingerprinting" activity		
Mon 9/16	11	How genetic variation arises by mutation Pt 2 (Causes & Consequences)
Wed 9/18	Exam 1: Lessons 1-9	
Fri 9/20	12	How genetic variation arises by recombination during meiosis

Date	Lesson	Topic
(9/23-9/25): Recitation #4: Meiosis		
Mon 9/23	13	How errors in meiosis lead to genetic variation
Wed 9/25	14	Transmission of independently assorting traits
Fri 9/27	15	Transmission of linked traits
(10/7-10/11) Recitation #5: CREATE paper part I		
Mon 9/30	16	Pedigrees and human disease
Wed 10/2	17	Modifications of Mendel's ratios
Fri 10/4	18	Gene Interactions and complementation
(10/14-10/16) Recitation #6: Review and practice problems for Exam 2		
Mon 10/7	Catch up / practice problems	
Wed 10/9	19	The **flow** of genetic information- **Transcription** part 1
Fri 10/11	20	The **flow** of genetic information- **Transcription** part 2
(10/21-10/23) Recitation #7: CREATE paper part II		
Mon 10/14	21	Gene expression: The making of a transcript
Wed 10/16	Exam 2: Lessons 10-19	
Fri 10/18	*Fall Break - No Class*	
(10/21-10/23) NO RECITATION		
Mon 10/21	22	Gene expression- **Translation** part 1
Wed 10/23	23	Gene expression- **Translation** part 2
Fri 10/25	24	Gene expression- **Translation** part 3
(10/28-10/30) Recitation #8: CREATE PAPER part III		
Mon 10/28	25	The nature of the genetic code
Wed 10/30	26	Revisiting alleles & mutations
Fri 11/1	27	Regulating gene expression in prokaryotes (part 1)

Date	Lesson	Topic
(11/4-11/6) Recitation #9: Gene Expression		
Mon 11/4	28	Regulating gene expression in prokaryotes (part 2)
Wed 11/6	29	Regulating gene expression in eukaryotes (part 1)
Fri 11/8	30	Regulating gene expression in eukaryotes (part 2)
(11/11-11/13) Recitation #10: Prokaryotic Gene Expression Regulation		
Mon 11/11	31	Epigenetics: Regulating gene expression in eukaryotes (part 3)
Wed 11/13	Catch up and review	
Fri 11/15	Exam 3: Lessons 20-30	
(11/18-11/21) NO RECITATION		
Mon 11/18	32	miRNA: Regulating gene expression in eukaryotes (part 4)
Wed 11/20	33	Recombinant DNA Technology (part 1)
Fri 11/22	34	Cloning a gene: Recombinant DNA Technology (part 2)
(11/25-11/27) NO RECITATION		
Mon 11/25	35	CRISPR: Recombinant DNA Technology (part 3)
Wed 11/27	Thanksgiving Holiday - No Class	
Fri 11/29		
(12/2-12/4) Recitation #11: Practice Problems		
Mon 12/2	36	TBD
Wed 12/4	Final Exam Review	