Genetics and Molecular Biology (BIOL 202)

Spring 2019 Section 007

Dr. Blaire Steinwand

MONDAY, WEDNESDAY, AND FRIDAY AT 1:25PM in COKER 201

Instructor: **Dr. Blaire Steinwand**
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Office hours: Thursday 1:30-3:30pm and Friday 12:10-1:10pm
*I **use sign up – please go to Sakai and sign up for office hours so that I know you are coming***

I am also available by appointment.
Please contact me if you cannot meet me during the times listed here!

Teaching Assistants: Ryan Kramer (rjkramer@live.unc.edu), Kayla Goforth (kaylago@live.unc.edu), and Haley Chi (hvasegh2@email.unc.edu)

Undergraduate Supplemental Instructor: John Brown (jbrown2@live.unc.edu)

Peer Mentors: Jaden Skelly (jj24601@live.unc.edu), Lillie Sims (lmsims@live.unc.edu), Nikolas Tsiouplis (njt1998@live.unc.edu), Christian Cobos (ccobos@live.unc.edu), Joanna Kuang (joannak@live.unc.edu), Shelby Auvil (shelbyl@live.unc.edu), Jacklyn Rojas (jnrojas@live.unc.edu), and James Chang (james279@live.unc.edu)

SAKAI SITE:
(you must have an onyen to log on – go to https://itsapps.unc.edu/improv/#UserCreateOnyenPlace:createOnyen if you do not have an onyen.) The Sakai site will have postings from lectures such as outlines, power point slides, and supplemental material we mention in lecture. I will also post announcements regarding student concerns on this site. *It is your responsibility to check it regularly*.

REQUIRED TEXT AND REQUIRED ONLINE MASTERING GENETICS ACCESS:
Essentials of Genetics. 9th Edition by Klug et al.
Feel free to choose a physical book or the ebook. The ebook is the cheaper option if you do not plan to keep your book.

**Required access to Mastering Genetics the online activity and homework tool. This comes included with a NEW physical textbook or ebook, but can be purchased separately if you buy a used book. If you have a used physical book, you can buy the Mastering Genetics access card at the bookstore but be aware that the cost of the access and a used book may be greater than purchasing a new book.

Required reading: Particular chapters are required (see course outline for "Guided Reading" details) and you will be expected to have read them before class so that you can complete the Mastering Genetics homework assignments and be able to participate fully in the in-class activities.

ADDITIONAL REQUIREMENTS: Basic knowledge of biology and chemistry as demonstrated by a C or above in BIOL 101 and CHEM 101 or 102 or equivalent.

HOMEWORK VIA MASTERING GENETICS: (10% of your grade) Homework will be due the morning before almost every class period at 8:00AM. Some assignments will take you as little as 15 minutes and others will take over an hour with the animations and short tutorials interspersed in the homework. **It is your responsibility to start it in a timely fashion, so that you finish it before the deadline.** To be safe, assume your clock is 5 minutes slower than the official *Mastering Genetics* time. Late homework will receive zero credit, even though you can still do them for practice. DO NOT ASK ME TO MAKE AN EXCEPTION TO THIS RULE. It is YOUR responsibility to finish the homework early so that any late-evening crises do not prevent your finishing on time. Do not count on the Mastering program to give an accurate account of how long an assignment will take. These estimates can be wildly off! There will be numerous graded at-home assignments. Realize that we are trying to *help* you to succeed by giving you these regular assessments. **COURSE ID: steinwand54441**

LEARNING CATALYTICS (6% of your final grade): As an incentive to come to class and be engaged, 6% of your grade will come from a program called Learning Catalytics that you use through your laptop or mobile phone. Note - missing just a couple of classes can quickly affect your participation grade! You can access LC through Mastering Genetics or directly by visiting learningcatalytics.com. Your instructor will provide the "session ID" for each class.

SUPPLEMENTAL INSTRUCTION (SI) and Peer Mentoring: ALL of the supplemental instructors and peer mentors were all VERY successful students of mine and are equipped with the knowledge and skills that you need to be successful in this course. The SI instructors will offer multiple sessions of supplemental instruction a week and will post problem sets for you on Sakai. They will also be in class helping you learn! In order for them to help you approach and analyze problems, you should bring problem sets and questions to them outside of class. Each session held by an SI instructor and peer mentor will be scheduled for 1 hour - the times and location of these sessions will be posted on Sakai during the first week of class. You are not required to attend either, but **attendance is highly recommended**, since this is your opportunity to get more help in this course. It is also worth noting that they have all seen many of my exams! I suggest you fit SI into your schedule and attend weekly as if it is a required class. The contact information for all of my SI instructors and peer mentors is listed above. Check Sakai for times and locations.

What is the difference between SI and peer mentoring?

SI is going to look like a review session with a group of students in attendance each week. Peer mentors are offering more "one-on-one" help. If you are interested in reviewing the topics more broadly – attend SI. If you feel you need to sit down with someone and work with them one-on-one, see a peer mentor!

PIAZZA: There are many of you and your questions are important to us. However, it is often difficult for a single instructor with so many students to address all of the e-mails that are received throughout the course of the course. Unfortunately, as a result, sometimes your e- mails even fall to the bottom of our inboxes and go unanswered. Therefore, in order to address your questions and concerns more efficiently, we will be using an online platform called "Piazza" this course. 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 TA, or your instructor. 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. You will

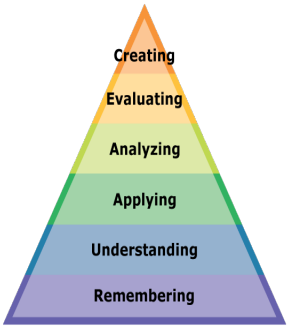
receive a welcome e-mail from your instructor granting you access to the course within the first week of the course and can start using Piazza right away.

WHAT YOU SHOULD BRING TO CLASS EVERY DAY:
1. Outlines from Sakai (either printed or on laptop).
2. Extra blank paper for drawings, notes, activities etc. (or tablet computer for drawing)
3. 3 x 5 index cards (with or without lines, preferably white).
4. Learning Catalytics device: either your cell phone for texting or laptop/ipad/smartphone for

COURSE GOALS: Many students like to complain that this is a "weed out" course. Of course, this is not true, but why does it have this reputation? Fact: the average grade in this class is in the B/C range; C's are not *bad* - they are *average*. If you are wondering if there is a pre-determined number of students that receive a C, D, or F – the answer is no! In theory, if the whole class performs at an A level, then the whole class is given A's.

And, this brings us to the goals of our course…

1. To provide you with the core principles of genetics and molecular biology.
The lecture and the book will provide the basic content. We will take a historical approach at times to see how famous experiments were performed. We will examine the basic "rules" of genetics that may then be altered to account for more complex situations. After this class, you will be prepared to do research in a lab on campus and to build upon this content with Biol 205 and upper level genetics courses.



Amended Bloom's Taxonomy: developed as a method of classifying educational goals for student performance evaluation. You should think about this as you study for exams and ask yourself, am I using different kinds of thinking?

2. To gain higher level thinking skills.
To the right you can see the "Amended Bloom's Taxonomy" pyramid. It was developed as a method of classifying educational goals for student performance evaluation. You should be well –equipped at remembering facts and content with good study habits. We are looking for you to *apply* and *analyze*. You are UNC students, we KNOW you can memorize! Move beyond this level of thinking. How can we achieve this? We will have in-class questions to practice this immediately and you will have homework problems to practice on your own. We will also explore classic experiments as a way of thinking through the logic of experiments and to see where the foundations of this content come from. While these may be new ways of thinking for you, practice is the most important way to gain these skills. FYI: UNC's medical school sees this is an excellent pre-req course for medical school because it teaches students to *think.*

3. This course should excite you about basic science and its applications.
A foundation in genetic crosses with model organisms (basic science tool) allows you to understand human genetic diseases. A foundation in making recombinant DNA constructs (basic science tool) allows you to understand how plants are modified to be herbicide resistant or how recombinant proteins can be turned into medicines. Genetics and molecular biology provide the "tools" that other disciplines call upon in biological research. Plant biologists, evolutionary biologists, clinical researchers *etc*. all use these tools.

TESTS: There will be three tests and a cumulative final exam given during the session.

The format will be multiple choice and short answer so you will need to bring two #2 pencils and a scantron form purchased at the bookstore to the test. With the exception of the final, these are not cumulative tests and will only cover the material specified on the course schedule. To see your scores from the multiple choice section of the exam follow the link on Sakai for "results of machine scored exams." There will be a final exam given, and it *will* be cumulative. For all exams, you will need your PID number as identification on your exam sheet. Additionally, you may be asked to verify your identity, so it is required that you bring your one-card to each exam. Failure to produce a one-card or other picture ID if asked may result in a zero on that exam. Test material to study: chapter reading outlines/homework, lecture activities, and power point slides. Therefore, to succeed in this class, it behooves you to take each reading/homework seriously and actively engage in all class discussions. **If you have a question related to points deserved, you must put it in writing no more than 5 days after an exam has been reviewed by you and turn it in to your instructor.**

NOTE: the final exam is Thursday April 30th at noon in Coker 201

DIGITAL ETIQUETTE: This course will require you to use your laptop and/or cell phone during class time. While I recognize that you are an excellent multi-tasker, research suggest that your peers are not. Please be respectful of your classmates and restrict your use of digital devices to course content. If we see that you or your peers are distracted, we will ask you to put your devices away and you may forfeit your ability to earn participation points that day. There will be times when you have completed your work or answered a poll question, but your peers have not. We ask that you assist your peers when appropriate or use the time to review your notes while you wait. I understand that your devices connect you to your friends and family (a wonderful thing!) but the classroom should be a place apart, however briefly (even if it seems like an eternity to you), from the outside world and distractions. You will learn more if you concentrate on the course while you are here and your classmates will thank you for not impeding their ability to learn.

DIVERSITY STATEMENT: The Department of Biology values the perspectives of individuals from all backgrounds reflecting the diversity of our students. We broadly define diversity to include race, gender identity, national origin, ethnicity, religion, social class, age, sexual orientation, political background, and physical and learning ability. We strive to make this classroom and this department an inclusive space for all students.

HOW IS YOUR GRADE DETERMINED? (*Note: there will be no changes to HOW your final average is calculated at the end of the course…**so please don't ask**! You will get the grade you EARN!)*

Your final average is calculated: Total for the course = (0.18 x test) + (18 x test) + (0.18 x test) + (0.20 x final exam) + (0.10 x homework average) + (0.10 x recitation average) + (0.06 x participation score)

In general, the scale for each letter grade comes very close to a 10 point scale. However I reserve the right to change that scale since it is impossible to predict the difficulty level of any particular test

HONOR CODE: All work done in this class must be carried out within the letter and spirit of the UNC Honor Code. You must sign a pledge on all graded work certifying that no unauthorized assistance has been given or received. You are expected to maintain the confidentiality of examinations by divulging no information about any examination to a student who has not yet taken that exam. You are also responsible for consulting with your professors if you are unclear about the meaning of plagiarism or about whether any particular act on your part constitutes plagiarism. Please talk with the professor if you have any questions about how the Honor Code pertains to this course.

COPYRIGHT POLICY

All course materials including your class notes and in-class assignments are covered by University Copyright Policy, @http://www.unc.edu/campus/policies/copyright%20policy%2000008319.pdf. This means it is illegal and an honor code offense to share your notes or any other course materials, including Mastering Genetics items with anyone not directly affiliated with this particular class. No uploading to non-class sharing sites.

Class Schedule:

Date	Lecture #	Topics covered, corresponding Guided Reading Questions (GRQs), and Mastering Genetics Assignments to complete:
Wed 1/8	1	**Introductions** **GRQ #1 due**
Fri 1/10	2	**How genetic information is organized in the genome** **GRQ #2 due**
NO RECITATION (1/8-1/10)		
Mon 1/13	3	**How genetic information flows from DNA to RNA to protein** **GRQ #3 due**
Wed 1/15	4	**Variation in genetic information – from genotype to phenotype** **GRQ #4 due**
Fri 1/17	5	**Process of Science: Discovery of DNA** **GRQ #5 due**
Recitation (1/13-1/17): BRCA case study: read through this case study and write a one-page report on your assigned character. Bring this report to recitation.		
Mon 1/20		**HOLIDAY – NO CLASS!**
Wed 1/22	5	**Discovery of how DNA replicates** **GRQ #6 due**
Fri 1/24	6	**How genetic information is copied in vivo and in vitro** **GRQs #7A and 7B due**
Recitation (1/20-1/24): PCR and DNA fingerprinting activity: print the worksheet titled "PCR and Fingerprinting" and bring it to recitation – you will complete this in recitation.		
Mon 1/27	7	**How genetic variation arises by mutation** **GRQ #8 due**
Wed 1/29	8	**How genetic variation arises by recombination during meiosis** **GRQ #9 due**
Fri 1/31	9	**How errors in meiosis lead to genetic variation** **GRQ #10 due**
Recitation (1/27-1/31): Practice questions and review for exam 1		
Mon 2/3	10	**Dosage compensation** **GRQ #11 due**
Wed 2/5	11	**Dosage compensation cont.**
Fri 2/7	13	**Catch up and review**
Recitation (2/3-2/7): Concept mapping		
Mon 2/10		**EXAM 1**

Wed 2/12	14	**The flow of genetic information – Transcription** **GRQ #12 due**
Fri 2/14	15	**Transcription cont.**
NO RECITATION (2/10 – 2/14)		
Mon 2/17	16	**The flow of genetic information continued – Translation** **GRQ #13 due**
Wed 2/19	17	**The Flow of genetic information from RNA to Protein: Deciphering the genetic code.** **GRQ #14 due**
Fri 2/21	18	**Revisiting the molecular basis of alleles and mutations** **GRQ #15 due**
Recitation (2/17-2/21): Go over Exam 1		
Mon 2/24	19	**Regulating the flow of information in prokaryotes** **GRQ #16 due**
Wed 2/26	20	**Regulating the flow of genetic information in prokaryotes II** **GRQ #17 due**
Fri 2/28	21	**Catch up and review**
Recitation (2/24-2/28): Practice thinking about the regulation of gene expression in prokaryotes: print the worksheet titled "Regulation of Gene Expression Activity" and it bring to recitation – you will complete this in recitation in pairs.		
Mon 3/2		**EXAM 2**
Wed 3/4	22	**Regulating the flow of information in eukaryotes** **GRQ #18 due**
Fri 3/6	23	**Regulating the flow of information in eukaryotes**
NO RECITATION (3/2-3/6)		
Mon 3/16	24	**Transmission on genetic information from one species to another – Recombinant DNA technology I** **GRQ #19 due**
Wed 3/18	25	**Recombinant DNA technology II** **GRQ #20 due**
Fri 3/20	26	**GMOs and CRISPR technology**
Recitation (3/16-3/20): Go over exam 2		
Mon 3/23	27	**GMOs and CRISPR technology cont.**
Wed 3/25	28	**Catch up**
Fri 3/27	29	**Practice for Exam 3**
Recitation (3/23-3/27): TBA		
Mon 3/30	29	**EXAM 3**
Wed 4/1	30	**Transmission of independently assorting traits** **GRQ #21**
Fri 4/3	31	**Transmission of independently assorting traits continued**

NO RECITATION (3/30-4/3)		
Mon 4/6	32	**Pedigrees and human disease** **GRQ #22**
Wed 4/8	33	**Pedigrees and human disease cont.**
Fri 4/10	34	**HOLIDAY – NO CLASS!**
Recitation (4/6-4/10): Practice with Pedigrees: print the worksheet titled "Pedigrees" and it bring to recitation – you will complete this in recitation.		
Mon 4/13	35	**Modifications of Mendel's ratios** **GRQ #23**
Wed 4/15	36	**Gene Interactions and complementation** **GRQ #24**
Fri 4/17	37	**Gene Interactions and complementation cont.**
Recitation (4/13-4/17): Practice with Epistasis and complementation: print worksheet titled, "Epistasis and complementation" and it bring to recitation – you will complete this in recitation.		
Mon 4/20	38	**Transmission of linked traits** **GRQ #25**
Wed 4/22	39	**Transmission of linked traits cont.**
Fri 4/24	40	**FINAL REVIEW**