

BIOL 310: GENETICS

Fall 2019

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Lecture Times & Location: [Removed]

Course Description

This course examines the basic principles of genetics in eukaryotes and prokaryotes at the level of molecules, cells, and multicellular organisms, including humans. Topics include Mendelian and non-Mendelian inheritance, structure and function of chromosomes and genomes, biological variation resulting from recombination, mutation, and selection, and population genetics.

Prerequisites:

Minimum grade of “C” in BIOL/Z 151, BIOL/Z152, and either BIOL 200, MATH 200/201 *and* STAT 210/212/314, or HONR 200.

*It is **highly recommended** that you successfully complete BIOL 300 (Cell & Molecular Biology) prior to enrolling in Genetics.*

Expectations

Genetics is a 300-level course, and as such, will not only be more rigorous than most courses you have taken, but will also draw heavily from material you learned (hopefully) in the prerequisite courses. If you struggled in those courses, you should think long and hard about whether you want to be in here. Genetics covers a lot of material, and we will not have much time to review the Bio basics you should already know, and we definitely will not be reviewing basic algebra. (Yes, there is math in this course. And story problems. You have been warned.)

The various concepts in this course are also very integrative, meaning that if you didn't understand what we did in chapter 7, this will make it nearly impossible for you to understand what we do, for example, in chapter 12. Therefore, if you get lost early on, it will be hard to catch up. (This means you should ask for help as soon as you realize there is a problem!).

This course also requires a considerable time commitment outside of class time. You will have weekly homework assignments, and you are strongly encouraged to attend weekly review sessions and study along the way (not the night before an exam!). It is *not* a course to be casually added to an already full schedule.

Please make sure you have the time, dedication and prior preparation (in the form of successfully completed prerequisites) that are necessary to succeed in BIOL 310.

Learning Outcomes

At the conclusion of this course you will have the knowledge, skill, and ability to:

- Correlate meiosis and mitosis with Mendel's principles.
- Make predictions of results for genetic crosses using Mendel's principles and probability concepts.
- Use Mendelian principles to explain different forms of inheritance: codominance, epistasis, and quantitative traits.
- Describe the structure and function of nucleic acids.
- Understand control of gene expression and its role in different biological processes.
- Explain the inheritance of traits using classical and molecular genetic concepts.
- Describe the role of genes in the evolution of organisms.
- Understand the importance of genetics in today's society.

Course Materials

Text (required*):

Genetic Analysis: An Integrated Approach, by Mark F. Sanders and John L. Bowman, 2nd edition. (ISBN-13: 978-0-321-94890-8).

*In the event of a class cancellation, students are expected to have access to the textbook.

Top Hat (required):

Top Hat is a classroom and student response system used to facilitate student participation during lectures using your electronic device (iPad, cell phone, tablet etc.). Check your email for the invite to purchase your subscription. *Top Hat points directly count toward your grade!* Failure to subscribe and participate during class will significantly affect your final grade in this course.

Blackboard will have announcements, course documents, homework assignments, and your current grades.

Please note E-mail Etiquette

Please make sure you tell me your class (Genetics) either in the subject line or at the start of your message. I am teaching almost 500 students this semester, so I will not automatically know who you are or what class you are in. Emails should be polite and professional – they should *not* sound like a text message you might send to a friend.

Please remember that this is a large class. Don't send me emails asking if you "missed anything" in class or what you should study for the exam. Lecture notes will always be available in Blackboard, and exam material will be from the power points (plus anything I add during lecture) with a special focus on problems covered in the homework.

E-mail response time:

I will do my best to respond to student emails within 24 hours during the week. However, I cannot always guarantee that this will happen, depending on how many emails I receive. If you need a response quickly (for example, you are stuck on the side of the road shortly before an exam!), please include the word "urgent" in the subject line and I will read and answer your email first.

Course Structure

This class meets three times a week and requires that you take an active part in the learning process through Top Hat, in-class activities and asking questions if you have them.

Attendance Policy:

Students are expected to attend and participate in all class meetings, including taking notes, writing answers to questions presented in class and working with classmates. *You are responsible for all course materials and content (including announcements) you miss due to an absence from class.*

- a) **Reminder:** Students who stop attending class must withdraw officially. I will not withdraw students. A grade of "F" will be assigned if a student simply stops attending.
- b) **Inclement Weather:** Lecture will generally meet unless officially canceled by VCU officials. Call the VCU "inclement weather hotline", 828-OPEN (828-6736), or go to www.vcu.edu/alert/.
- c) **If class is canceled:** If I must cancel a class period despite campus being open, I will send an email announcement via Blackboard. Please check your VCU email if you are ever unsure whether class will be held. If you have not received an email, you can assume we will have class.

Electronic devices:

Students may use laptops, iPads, tablets, and recording devices for *class purposes only*. **You are required to have one electronic device to use Top Hat.** Students caught checking e-mail or Facebook, sending text messages, playing on the Internet, etc., will be asked to leave the classroom. Cell phones and pagers must be *set*

to silent during lecture and may not be on you during exams (see Honor Code Policy).

If another student's inappropriate use of their electronic device is a distraction to you, please bring this to my attention so that I can address the issue.

Assignments

Homework assignments will be from the textbook and are intended to reinforce concepts covered in class. You are required to complete the homework assignments and submit them in Blackboard by the deadline. Homework is graded based on completion and showing your work, not simply on correctness, as many times the answers will be available in the back of the textbook. For any problem for which the answer is given ahead of time, full points will be awarded if you show your work *and* arrive at the correct answer. If an answer is not available, you can receive full points for showing your work and making a good attempt.

Submitting Homework Assignments:

Assignments must be submitted in Blackboard – no exceptions! You are welcome to do them by hand and scan in the paper, or simply take a photo and upload it as a JPEG file. However, it is *your responsibility* to make sure the file uploaded correctly and is readable (this refers both to someone else being able to open the file as well as the work being legible). I will be somewhat lenient on this *on the first assignment only* – after that, you are expected to know how to upload files in an appropriate format.

Please note: you will NOT receive extensive feedback on your homework problems, as this would lead to an overwhelming amount of work for my preceptors. They will generally give you the benefit of the doubt: if you completed the assignment and it looks like you made an effort (this primarily means you showed your work and they can follow it), you will receive the points. If you didn't do one of the problems, or didn't finish a problem, obviously this will cost you points. It is *your responsibility* to do the whole assignment, and in no scenario will I give extensions if you “forgot” to do part of it or accidentally only uploaded a portion of the assignment. Late assignments will lose 20% per day they are late, starting immediately after the deadline. Please do not ask for full points if your assignment was submitted late.

Answer keys for homework problems (including showing work) will be posted to Blackboard after the due date. Sometimes it will be the next day, sometimes 2 or 3 days later. Please don't email me about the answer key unless it's been more than 3 days since the assignment was due.

Working with others/copying homework: You are obviously expected to do the homework yourself rather than copying someone else's work. I don't mind if you work in pairs or groups, and I can't actually stop you from copying it outright. However, Genetics is a subject that is best learned by doing problems, and you should view the homework as exam practice, rather than a chore you need to get done or points you need to earn. It is not uncommon for exam questions to be a variation on a homework problem, and it is generally very obvious when a student hasn't been doing the homework. ***With very few exceptions, students who don't take the time to complete and understand the homework will not earn passing grades on exams.***

Top Hat will be used to facilitate student participation in the class, and for quizzes. These will be two separate grades: 10% for participation in lectures (counting only your “participation” grade) and 10% for quizzes (counting your “correctness” grade). Quizzes will be given at the start of class and will always cover the previous lecture's material. Please don't ask me what will be on a quiz! *There are no make-up quizzes.* If you miss a quiz and wish for it to be dropped from your grade, requirements are identical to those for a make-up exam (see below).

Students are required to bring an electronic device to lectures so that they can participate via Top Hat. *It is your responsibility to check your Top Hat account regularly to make sure your answers submitted successfully.* I will not adjust Top Hat grades at the end of the semester because you failed to realize that there was a problem with answer submission. If, on a given day, you submitted the answers and one or more fail to show up in your account, please contact Top Hat customer service right away. As long as you signed in on that day, they will be able to restore your missed participation points. Do NOT wait until the end of the semester to do this!! It may take a few days for your

points to be restored, and if you wait too long and I have already downloaded the gradebook, I will not go back and manually adjust your grade. You have been warned.

Exams:

There are *four exams* given during the semester as well as an *optional “make-up” exam* on the last day of class which can substitute for one of your earlier exam grades (exams 1, 2 or 3). Questions are a combination of multiple-choice and short answer/free response questions and are based on material presented in class and the homework. Short answer questions are often in the form of story problems that will test your overall understanding of concepts learned in class. Memorization alone will not be enough to do well on exams! Your studying should focus on fully understanding the concepts and *why* problems are approached the way they are, so that you can apply this knowledge to new problems. In this way, Genetics is more similar to a Chemistry or Physics class than many other Bio classes (and yes, it includes math – you have been warned!).

- a) *Seats are randomly assigned at the start of each exam.* You may *not* seat yourself on exam days; instead, wait for a preceptor to show you where to sit.
- b) You **MUST** place all personal items (notes, books, backpack, purses, PHONES, any clothing you are not wearing such as a coat, etc.) except writing tools and a calculator at the front of the classroom *prior to* sitting down in your assigned seat.
- c) *You are required to bring your own pencil* on exam days. Approximately half of each exam will consist of multiple choice questions which must be answered in pencil on a Scantron form (the form is provided for you). You should also make sure your pencil is sharpened before class. Ideally, bring two pencils just in case. Short answer questions may be answered in pen or pencil based on your preference.
- d) Phones **MUST** be turned off and left with other personal items. ***Having a phone in your possession during an exam is against course policy and will result in a “0” on the exam – even if it is turned off and you are not using it!*** Any forms of cheating on an exam will result in the filing of an honor code complaint. I reserve the right to record possible instances of academic misconduct during exams to include as evidence in honor trials.
- e) It is *your* responsibility to bring a calculator on exam days. If you forget to bring one, you can check one out from the library, but this will cost you time and you will not be given additional time on the exam.
- f) **After the exam:** You must bring your *student ID* with you on exam days and show it when turning in your exam. In addition, you will sign your name on a separate sheet of paper once you turn in your exam. This way, there can be no question of who did or did not hand in an exam.
- g) **Absences from an exam:** Due to the size of the class I **only** offer make-up exams in extenuating circumstances.

If you have a valid reason to miss an exam **you must contact me prior to missing the exam and receive my approval** for alternative arrangements. **DO NOT** simply fail to show up and assume we can “work it out” later on! You also should not assume that because you sent me an email asking for a make-up, you will automatically get one. Valid reasons for missing an exam include: funerals of close friends or family members (must provide obituary), hospitalization of the student (must provide hospital documentation), or severe/contagious illness of the student (must provide an official doctor’s note *stating specifically that you were advised not to attend class on this specific day*– please note VCU health services notes rarely state this. “So-and-so was seen by student health” is **NOT** a sufficient excuse and will **NOT** get you a make-up exam!). Other reasons may be considered but official documentation must be provided. ***If no proof is provided you will receive a 0.***

There may be times when it is truly impossible for a student to contact me before missing an exam. Such cases will be considered on a case-by-case basis, and exceptions may be made *at the instructor’s discretion*. You should always try to explain your absence as soon as reasonably possible.

Valid reasons do **NOT** include being stuck in traffic (it is your responsibility to get here in time to take exams!), any non-emergency doctor/dentist appointment, a sick roommate/friend/family member, forgetting there was an exam that day or a family trip.

In the event that I approve an absence, the make-up exam must be scheduled and taken *no later than 2 business days* after the student is cleared to return to class or returns from a funeral. This may mean missing work or another class, so please plan ahead if you must miss an exam. (Exceptions may be made for extended illness/hospitalization of over 1 week). Make-up exams will generally NOT be identical to the exam taken by the class.

If you wish to take “Exam 5” to replace another exam grade, you MUST take it on the scheduled date (last day of class) – no make-ups will be allowed as this is already a make-up exam.

- h) Following the release of your grade in Blackboard, you have **one week** to view your exam in the main Biology office (Life Sci Bldg Room 126), and to request a re-grade if you believe there is an error. If you ask me to re-grade your exam, I will look over your whole exam in case there are other grading errors. *Please be aware that this can lead to a grade change in either direction. Re-grades are final and not negotiable.*

Review and Supplemental Instruction

1. **Review sessions:** Preceptors will host *50-minute review sessions* each week. The schedule will be posted to Blackboard in the coming days. You should come prepared to work on suggested chapter questions and/or assignments preceptors assign.
2. **Supplemental Instruction (SI)** sessions are available for free, courtesy of VCU. SI sessions are held by tutors who will provide additional review and study sessions for this course. I highly encourage you to make use of this free resource. More information can be found at: <http://uc.vcu.edu/learning-support/campus-learning-center/supplemental-instruction/>

Extra credit opportunities:

20 points total (2% added to final grade)

1. Preceptor and/or SI review sessions: maximum 13 points
 - a. You can only get ONE point per week even if you attend more than one review session.
2. Course evaluations: up to 3 points (depends on overall class response rate)
 - a. End of semester evaluation: 2 points if greater than 70%, 3 points if greater than 85%
3. Preceptor evaluations: 2 points for completion (on an individual basis)
4. TopHat “Correctness” Score: If your score at the end of the semester is over 80%, you earn 2 points of extra credit

Grading

The final grade scale is based on a possible total of 100%.

Final Grade Scale
89.90 -100% = A
79.90-89.89% = B
69.90-79.89% = C
59.90-69.89% = D
Below 59.90% = F

Category	Percent
Top Hat (Participation)	10%
Top Hat (Quizzes)	10%
Homework	10%
In-Class Exams (4)	70%
Total	100%

I DO NOT BEND ON THESE GRADE BARRIERS. Sorry, the line has to be somewhere. Letter grades will be assigned at the end of the course. Please be aware that I do not curve exams or final grades. I also do not “round” grades or drop grades. Only changes due to mathematical error will be granted.

Sample Grade Calculation with extra credit

Top Hat Participation = 91%, Top Hat Quiz Average = 75%, Homework Average = 80%, Exam Average = 89.25%,
Extra Credit = 1.5%

$(0.1 * 91) + (0.1 * 75) + (0.1 * 80) + (0.7 * 89.25) + 1.5 = 9.1 + 7.5 + 8 + 62.5 + 1.5 = 88.6\%$ which is a B.

Please note that your current grade in the class will always be shown in the “Weighted Total” column in Blackboard. It is NOT based on the overall number of points you have earned, but on the percentages earned in each category (exams, homework, Top Hat).

Grades on exams, homework, etc. will be posted in Blackboard and you will have one week to check them and contact me with any questions or concerns about them. **No grades will be changed after the one-week period, so please make it a habit to check Blackboard regularly.**

A note on grading:

Your grade in this course will depend entirely on how well YOU know the material we cover, and on your ability to demonstrate to me that you know it on exams. Your grade will NOT be in any way influenced by how well I like you, how hard you say you worked in the class, how many times you have already taken this class, whether you need a certain grade to keep your scholarship, get into medical school, or graduate; your grades in other/previous classes, or the grade earned by another student. Please don't ask me to adjust your grade for any of these reasons.

Course Schedule

Date	Topic
Week 1 [Removed]	Welcome to Class! Syllabus, Course Organization Start Chapter 2: Mendelian Genetics
Week 2 [Removed]	Continue Chapter 2: Mendelian Genetics
	<i>Add/Drop Ends at midnight on [Removed]</i>
Week 3 [Removed]	No Class on [Removed] Chapter 3: Cell Division & Chromosome Heredity; MEIOSIS
Week 4 Sept 9, 11 & 13	Chapter 4: Gene Interactions
Week 5 [Removed]	[Removed]: Catch-up Day [Removed]: Exam 1: Chapters 2, 3, 4 [Removed]: Start Chapter 5
Week 6 [Removed]	Chapter 5: Genetic Linkage
Week 7 [Removed]	Chapter 7: DNA Structure & Replication
Week 8 [Removed]	Chapter 8: Transcription & RNA Processing
Week 9 [Removed]	Monday: Catch-up Day [Removed]: Exam 2 Chapters 5, 7 and 8 No Class on [Removed] (Reading Day)
Week 10 [Removed]	Chapter 9: The Molecular Biology of Translation Start Chapter 11
Week 11 [Removed]	Chapter 11: Chromosome Structure Chapter 12: DNA Mutations and Repair [Removed]: Last day to withdraw with a grade of 'W'
Week 12 [Removed]	[Removed]: finish Chapter 12 [Removed]: Catch-up Day [Removed]Exam 3 Chapters 9, 11 and 12

Week 13 [Removed]	Chapter 13: Chromosome Aberrations Start Chapter 15
Week 14 [Removed]	Chapter 15: Regulation of Gene Expression in Eukaryotes Chapter 19: Mitochondrial DNA
Week 15 [Removed]	NO CLASS – Thanksgiving Break
Week 16 [Removed]	Chapter 17: Recombinant DNA Technologies [Removed]Exam 4 Chapters 15, 17 and 19
[Removed]	OPTIONAL EXAM 5

The instructor reserves the right to make changes to the syllabus or to make exceptions to these policies in appropriate circumstances. Such changes will always be announced in class, and an updated version of the syllabus will then be posted to Blackboard.

Important Information from the Provost Office

The required syllabus statements originally included here are maintained by the Office of the Provost and are regularly updated. To prevent the dissemination of information which may no longer be accurate or complete, the full text of the required syllabus statements have been removed from this document.

Students should visit <http://go.vcu.edu/syllabus> and review all syllabus statement information. The full university syllabus statement includes information on safety, registration, the VCU Honor Code, student conduct, withdrawal and more.