

# GENETICS

## BIOL 310, SPRING 2017

**Instructor:** Teshell K. Ponteen Greene

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**Office Hours:** By appointment only using Google Calendar link on Bb.  
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**Lecture:** TR 8:00 – 9:15 am Trani 151  
TR 12:30 – 1:45pm Oliver 1024

### Course Description

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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. Concepts are reinforced through case study group work activities.

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

### Course Goals

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Students will gain knowledge of how to apply concepts of modern transmission and molecular genetics; sharpen their critical thinking and leadership skills through group work, quantitatively analyze data and predict outcome using common biology techniques, and hone their written presentation skills.

### Learning Outcomes

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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.
- Discuss case study problems and formulate answers that apply the course content in a collaborative group.

### Required Course Materials

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**Text:** Genetic Analysis An Integrated Approach by Mark F. Sanders and John L. Bowman with Mastering Genetics, 2<sup>nd</sup> edition. There are two options for purchasing the book. The first is the hardcopy with Mastering (ISBN-13: 9780321948465, \$230) and the second, e-Text with Mastering (ISBN-13: 9780133982114, \$95.95) both from [www.mypearsonstore.com](http://www.mypearsonstore.com).

**MasteringGenetics:** Use your access code to register for the software from the course's Blackboard site (Register for Mastering handout under the Mastering link). The last date to register is January 27, 2017. You can use the 14-day trial and then pay for the subscription later.

**Top Hat** is a classroom and student response system used to increase your engagement during lectures using your electronic device (iPad, cell phone, tablet etc.). Subscription options are: 1) one semester (4 months) = \$24, 2) one year = \$36, and 3) lifetime = \$72. Check your email for the invite to purchase your subscription.

**Blackboard** will have announcements, course documents, grades, Frequently Asked Questions (FAQs) etc.

## **Please note E-mail Etiquette**

Always identify yourself by full name and include your class in the subject area. Basic consideration and politeness is expected. Please no 'text messaging' style messages.

Consult the FAQs section of the course on the Blackboard site before sending an email. This section is in place to limit the number of emails from students; therefore, emails referring to topics discussed in the FAQs section will be disregarded. Please remember that this is a large class. If the preceptors can answer your questions about class content, please contact them first.

## **Course Structure**

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This class meets twice a week and requires that you take an active part in the learning process. It is my goal to bring critical thinking, rigor, creativity and a spirit of excitement about biology to this class. Therefore, your time in class will be spent in a mix of traditional lectures and group work to add to and clarify readings and concepts.

1. **Small group work:** We will spend a significant portion of class doing individual and small group work activities. This will provide you with critical opportunities to practice problem solving skills and peer-to-peer teaching. Groups of 3 are randomly assigned during the second week of classes, following the add/drop period. You must check Bb to verify your group members and initiate an introduction prior to our first in class assignment. You will work with the same group members throughout the semester.
2. **Attendance Policy:** Although attendance is not required, to successfully master the material and receive the desired grade in the course, students are strongly encouraged to attend and be prepared to 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 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.
  - b) **Inclement Weather:** Lecture will meet unless officially canceled by VCU officials. Call the VCU "inclement weather hotline", 828-OPEN (828-6736), or go to [www.vcu.edu/alert/](http://www.vcu.edu/alert/).
3. **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, surfing the Internet, etc., will be asked to leave the classroom. Cell phones and pagers must be turned to silence during lecture and may not be on you during exams (see Honor Code Policy).

## **Assignments**

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1. **Case Study Group work** may include brief reading, data analysis, and interpretation of graphs, and are divided into three assignments to be completed in the order highlighted below.
  - a) Pre-scenario questions on Bb under assignments, due the day before class.
  - b) In class group assignment (see below for grading criteria)
    - i. You will be graded on participation and correctness (Self and Peer Assessment)
      1. Each student must evaluate his/her contribution to the assignment
      2. Each student must also evaluate the other's contribution to the assignment.
      3. You will submit the self and peer assessment sheet once you complete the assignment.
  - c) Individual homework assignment must be turned into your preceptor at the start of the next class.
    - i. Work turned in late will be penalized 10% per day. Work is not accepted beyond 7 days.
2. **MasteringGenetics homework assignments** are assigned to reinforce chapter reading and concepts covered in class. Some assignments will take you as little as 15 minutes and others will take over an hour and have animations and short tutorials interspersed. **It is your responsibility to start it in a timely fashion, so that you finish it before the deadline (see class schedule).** 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. Always record your Mastering grade as it takes a while to update on Bb.

3. **Exams:** There are **four exams** given during the semester. All test are comprehensive, although some cover distinct chapters. Be careful not to “pigeonhole” your learning as simply memorizing isolated concepts and examples will not work. You will need to integrate concepts you saw in prior chapters. Moreover, what you understand by the end of the course matters most. Questions are a combination of multiple-choice, matching, and short answer questions and are based on material presented in class, case studies and chapter questions.
- Seats are randomly assigned before the exams.
  - You **MUST** place all personal items (food, drink, notes, books, pack, purses, PHONES, baseball caps, etc.) except writing tools at the front or rear of classroom prior to picking up exam and seat number from the preceptor.
  - 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**. **Using a phone or similar device** during an exam, and other forms of cheating on an exam, will result in the filing of an honor code complaint. The teaching staff reserves the right to record possible instances of academic misconduct during exams to include as evidence in honor complaints.
  - No make up exams: Permission from the instructor is required in order to miss an exam with an approved excuse.** Missing two exams will result in a failing grade for the course. Permission for missing an exam will require a physician’s note for illness of the student or family member or other official notice for more serious family events. All documentation must be in English.
  - Following the release of your grade on Bb, you have **one week** to view your exam in the main Biology office, and to email and or visit Dr. Greene with any scoring issues etc.

## Review and Supplemental Instruction

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- Review sessions:** Preceptors will host 50-60 minute review sessions each week. See the schedule below. You can also check the Review Session link on Bb. You should come prepared to work on suggested chapter questions and/or assignments preceptors assign.

	Mon	Tues	Wed	Thurs	Friday
9:00 AM					
10:00 AM					
11:00 AM					
12:00 PM					
1:00 PM					
2:00 PM					
3:00 PM					
4:00 PM					
5:00 PM					

- 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. If you are struggling in this class, having attended class and review sessions, I highly encourage you to make use of this free resource. All information for the SI leader is also posted on Bb. More information can be found at: <http://uc.vcu.edu/learning-support/campus-learning-center/supplemental-instruction/>

## Grade Calculation

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The final grade scale is based on a possible total of 100%. This grade reflects what you have earned in the class, not what I have given you. Please be aware that I do not curve any exam or final grades. There are several times throughout the semester to gain extra credit. I also do not “round” grades. Only changes due to mathematical error will be granted. A grade of Incomplete (I) will be given only if an excused absence is granted for the final exam.

### Final Grade Scale

90.0-100% = A  
80.00-89.99% = B  
70.00-79.99% = C  
60.00-69.99% = D  
Below 60.00% = F

Category	Percent
Top Hat Questions	3%
Mastering Genetics Homework	12%
Case Study Scenario Questions	2%
In Class Case Study Group Work	10%
Case Study Homework	8%
Exams (1-IV)	65%
<b>Total</b>	<b>100%</b>

Extra credit opportunities: 20 points total (2.0% added to final grade)

1. Review sessions with preceptors or SI sessions: maximum 14 points
  - a. You can only get ONE point per week depending on which you go to.
  - b. For instance, if you attend the SI, and review, it is still ONE point.
2. Course evaluations: up to 5 points (depends on overall class response rate)
  - a. Mid-semester: 1 point if greater than 70% response
  - b. End of semester VCU: 1 point if greater than 50%, 2 points if greater than 80%
  - c. Dr. Greene's end of semester: 1 point if greater than 50%, 2 points if greater than 80%
3. Preceptor evaluations: 1 point for completion

### Sample Grade Calculation with extra credit

Top Hat average = 90%, mastering homework average = 80%, scenario = 90%, group work = 95%, homework = 85%, exam average = 89.25%, extra credit = 1.5%

$$3\%(90) + 12\%(80) + 2\%(90) + 8\%(95) + 10\%(85) + 65\%(86.25) + 1.5\% \\ 2.7 + 9.6 + 1.8 + 7.6 + 8.5 + 56 + 1.5 = 87.7\% = B$$

## Important Information from the Provost Office

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### Campus emergency information

What to know and do to be prepared for emergencies at VCU:

- Sign up to receive [VCU text messaging alerts](#). Keep your information up-to-date.
- Within the classroom, the professor will keep his or her phone on to receive any emergency transmissions.
- Know the safe evacuation route from each of your classrooms. Emergency evacuation routes are posted in on-campus classrooms.
- Listen for and follow instructions from VCU or other designated authorities. Within the classroom, follow your professor's instructions.
- Know where to go for [additional emergency information](#).
- Know the emergency phone number for the VCU Police (828-1234).
- Report suspicious activities and objects.
- Keep your permanent address and emergency contact information current in eServices.

### Class registration required for attendance

Students may attend only those classes for which they have registered. Faculty may not add students to class rosters or Blackboard. Therefore, if students are attending a class for which they have not registered, they must stop attending.

### **Honor System: upholding academic integrity**

Genetics has **zero tolerance towards academic misconduct** and will strictly enforce the VCU Honor Code without exception. Evidence and/or suspicions of cheating, abusing academic materials, facilitating academic dishonesty, or soliciting others to engage in any of these acts will be referred to the Honor System Coordinators for possible disciplinary action. The VCU Honor System policy describes the responsibilities of students, faculty and administration in upholding academic integrity, while at the same time respecting the rights of individuals to the due process offered by administrative hearings and appeals. According to this policy, "Members of the academic community are required to conduct themselves in accordance with the highest standards of academic honesty, ethics and integrity at all times." In addition, "To support a commitment to the Honor System, all members of the VCU community are required to:

- Adhere to the Honor System policy and its procedures;
- Report any suspicion or knowledge of possible violations of the Honor System;
- Answer truthfully when called upon to do so regarding Honor System matters;
- Maintain appropriate confidentiality regarding related to Honor System matters.

More information can be found at in the [VCU policy library](#).

### **Important dates**

You can view important dates for the semester in the [academic calendar](#).

### **Managing stress**

Students may experience situations or challenges that can interfere with learning and interpersonal functioning including stress, anxiety, depression, alcohol and/or other drug use, concern for a friend or family member, loss, sleep difficulties, feeling hopeless or relationship problems. There are numerous campus resources available to students including University Counseling Services (804-828-6200 MPC Campus, 804-828-3964 MCV Campus), University Student Health Services (MPC 804 828-8828, MCV Campus 804 828-9220) and the Wellness Resource Center (804-828-9355). 24 hour emergency mental health support is available by calling 828-1234 and asking to speak to the on-call therapist or utilizing the National Suicide Prevention Lifeline (1-800-784-2433).

Mandatory responsibility of faculty members to report incidents of sexual misconduct

It is important for students to know that all faculty members are mandated reporters of any incidents of sexual misconduct/violence (e.g., sexual assault, sexual exploitation and partner or relationship violence). This means that faculty cannot keep information about sexual misconduct/violence confidential if you share that information with them and they must report this information immediately to the university's Title IX Coordinator. In addition, department chairs, deans, and other unit administrators are required to report incidents of sex or gender-based discrimination to the university's Title IX Coordinator. Once a report is made, you will receive important information on your reporting options, on campus and off campus resources and remedial measures such as no-contact directives, residence modifications, and academic modifications. If you would prefer to speak with someone confidentially for support and to discuss your options for reporting, contact:

VCU's Wellness Resource Center 804.828.9355 | [myoptions@vcu.edu](mailto:myoptions@vcu.edu) | [thewell.vcu.edu](http://thewell.vcu.edu)

Greater Richmond Regional Hotline (Community program) 804.612.6126 | 24-hour hotline

VCU's Counseling Services 804-828-6200

For more information on how to help, please [click here](#). The Policy on Sexual Misconduct/Violence and Sex/Gender Discrimination, can be found in the [VCU policy library](#). For more information about the University's Title IX process, please visit [equity.vcu.edu](http://equity.vcu.edu).

### **Military short-term training or deployment**

If military students receive orders for short-term training or for deployment/mobilization, they should inform and present their orders to Military Student Services and to their professor(s). For further information on policies and procedures contact Military Student Services at 828-5993 or access the corresponding policies.

Student conduct in the classroom

According to the [Faculty Guide to Student Conduct in Instructional Settings](#), "The university is a community of learners. Students, as well as faculty, have a responsibility for creating and maintaining an environment that supports effective

instruction. In order for faculty members (including graduate teaching assistants) to provide and students to receive effective instruction in classrooms, laboratories, studios, online courses, and other learning areas, the university expects students to conduct themselves in an orderly and cooperative manner." Among other things, cell phones should be turned off while in the classroom. The Student Code of Conduct also prohibits the possession of or carrying of any weapon. For more information see <http://register.dls.virginia.gov/details.aspx?id=3436>.

### **Student email policy**

Email is considered an official method for communication at VCU because it delivers information in a convenient, timely, cost-effective, and environmentally aware manner. Students are expected to check their official VCU email on a frequent and consistent basis in order to remain informed of university-related communications. The university recommends checking email daily. Students are responsible for the consequences of not reading, in a timely fashion, university-related communications sent to their official VCU student email account. This policy ensures that all students have access to this important form of communication. It ensures students can be reached through a standardized channel by faculty and other staff of the university as needed. Mail sent to the VCU email address may include notification of university-related actions, including disciplinary action. Please read the policy in its entirety at the [VCU Policy Library](#).

### **Student financial responsibility**

Students assume the responsibility of full payment of tuition and fees generated from their registration and all charges for housing and dining services, and other applicable miscellaneous charges. Students are ultimately responsible for any unpaid balance on their account as a result of the University Financial Aid Office or their third party sponsor canceling or reducing their award(s).

Students representing the university – excused absences

Students who represent the university (athletes and others) do not choose their schedules. Student athletes are required to attend games and/or meets. All student athletes should provide their schedules to their instructors at the beginning of the semester. The Intercollegiate Athletic Council strongly encourages faculty to treat missed classes or exams (because of a scheduling conflict) as excused absences and urges faculty to work with the students to make up the work or exam.

### **Students with disabilities**

Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, as amended, require that VCU provide "academic adjustments" or "reasonable accommodations" to any student who has a physical or mental impairment that substantially limits a major life activity. To receive accommodations, students must register with the Disability Support Services Office on the Monroe Park Campus (828-2253) or the Division for Academic Success on the MCV campus (828-9782). Please also visit the [Disability Support Services website](#) and/or the [Division for Academic Success website](#) for additional information.

Once students have completed the DSS registration process, they should schedule a meeting with their instructor (s) and provide their instructor (s) with an official DSS accommodation letter. Accommodation letters will outline the required classroom accommodations. Additionally, if coursework requires the student to work in a lab environment, the student should advise the instructor or a department chairperson of any concerns that the student may have regarding safety issues related to a disability. Students should follow this procedure for all courses in the academic semester.

### **Withdrawal from classes**

Before withdrawing from classes, students should consult their instructor as well as other appropriate university offices. Withdrawing from classes may negatively impact a student's financial aid award and his or her semester charges. To discuss financial aid and the student bill, visit the [Student Services Center](#) at 1015 Floyd Avenue (Harris Hall) and/or contact your financial aid counselor regarding the impact on your financial aid.

## **Letters of Recommendation**

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Due to the high level of demand for letters of recommendation, this is my policy:

You must provide at least **three weeks notice**, preferably more, before your letter is due. I will not consider writing a letter that is due in less than two weeks!

**Letter of recommendation to professional school (medical, dental, vet, nursing, pharmacy, etc.) and to the VCU Pre-Health Track Committees (or any other pre-professional school committee):**

- I only write these letters for students who have served as my preceptors, completed two courses with me or that I have worked with closely in some other manner.
- A successful letter of recommendation to a professional school must have detailed information about a student's personality, work ethic, scholastic performance, reliability, interpersonal relationships, etc.
- I can only get to know a student well enough to write this letter by working with them personally, as I do my preceptors. To become a preceptor, you must have an A or a B in that course with me and be able to attend lecture during that semester.

**Letter of recommendation to undergraduate programs (travel abroad, summer research, etc.):**

- You must complete a course with me. Furthermore, you must be someone I am familiar with and meet on a regular basis (office hours, before/after class, etc.).
- If I agree to write a letter for you, please email me a CV or resume with a picture on it, and all the necessary paperwork to accompany the letter. Provide a list of all the classes you have taken with me, including the semester. Make sure to tell me when the letter is due, where to send the letter, and tell me about the program you are applying for and why you want to be in it.
- Also make sure you have filled out your section of the form and signed where needed. Please make sure that the document file format is a type that I can edit.

Please be advised that the better I know you, the better (and longer) your letter will be. If I have agreed to write a letter for you, but have not spent a lot of time with you, the letter will be short. If this letter of recommendation is for something very competitive or important to you, your application may suffer considerably from a short letter. You may want to ask someone who knows you better and can write more confidently about you.

Lastly, please note that letter of recommendation writing is completely voluntary; I am free to deny a letter to anyone for any reason.

## **Tentative Schedule**

**(May change to accommodate pace)**

Jan 17	Introduction to Course (Concept Maps, Case Studies, Top Hat)
Jan 19	Chapter 1: The Molecular Basis of Heredity
Jan 24	Chapter 1: The Molecular Basis of Heredity, <u>Mock Group Work</u>
Jan 26	Chapter 3 (3.1-3.2): Review of Cell Division
Jan 27	Mastering Genetics Homework due, 11:59 pm deadline; Tutorial + Chap 1
Jan 29	Mastering Genetics Homework due, 11:59 pm deadline; Chap 3 Cell Division
Jan 31	Chapter 2 (2.1-2.3): Mendelian Genetics Part I
Feb 2	Chapter 2 (2.4-2.6): Mendelian Genetics Part II, <u>Group Work: It's All Greek to Me!</u>
Feb 3	Mastering Genetics Homework due, 11:59 pm deadline; Chap 2 Mendelian Part I
Feb 5	Mastering Genetics Homework due, 11:59 pm deadline; Chap 2 Mendelian Part II
Feb 7	Chapter 3 (3.3-3.2): Chromosome Heredity *Greek To Me Homework due
Feb 9	Chapter 4 (4.1-4.2): Gene Interaction Part I
Feb 10	Mastering Genetics Homework due, 11:59 pm deadline; Chap 3 Chromosomes
Feb 12	Mastering Genetics Homework due, 11:59 pm deadline; Chap 4 Part I
Feb 14	<b>Exam # 1 Chapters 1-3</b>

Feb 16	Chapter 4 (4.3): Gene Interaction Part II, Epistasis
Feb 19	Mastering Genetics Homework due, 11:59 pm deadline; Chap 4 Part II
Feb 21	Chapter 5 (5.1-5.2): Genetic Linkage Part I, <u>Group Work: Bloodline</u>
Feb 23	Chapter 5 (5.3) Genetic Linkage Part II, 3 Point Test Cross *Bloodline Homework due
Feb 24	Mastering Genetics Homework due, 11:59 pm deadline; Chap 5 Part I
Feb 26	Mastering Genetics Homework due, 11:59 pm deadline; Chap 5 Part II
Feb 28	Chapter 11(11.3-4): Chromosome Structure
Mar 2	Chapter 13 (13.1-13.4): Chromosome Aberrations
Mar 3	Mastering Genetics Homework due, 11:59 pm deadline; Chap 11
Mar 5	Mastering Genetics Homework due, 11:59 pm deadline; Chap 13
Mar 7	<b>NO CLASS – Spring Break</b>
Mar 9	<b>NO CLASS – Spring Break</b>
Mar 14	<b>Exam # 2 Chapters 4, 5, 11, 13</b>
Mar 15	Chapter 7 (7.1-7.4): DNA Structure and Replication Part I
Mar 19	Mastering Genetics Homework due, 11:59 pm deadline; Chap 7 Part I
Mar 21	Chapter 7 (7.4-7.5): DNA Structure and Replication Part II, <u>Group Work: Druid Dracula</u>
Mar 23	Chapter 8 (8.1- Alternative Transcripts): Molecular Biology of Transcription and RNA Processing *Druid Homework due
Mar 24	Mastering Genetics Homework due, 11:59 pm deadline; Chap 7 Part II <b>Last day to withdraw with a “W”</b>
Mar 26	Mastering Genetics Homework due, 11:59 pm deadline; Chap 8 Transcription
Mar 28	Chapter 9: The Molecular Biology of Translation
Mar 30	Chapter 15 Regulation of Gene Expression in Eukaryotes
Mar 31	Mastering Genetics Homework due, 11:59 pm deadline; Chap 9 Translation
Apr 2	Mastering Genetics Homework due, 11:59 pm deadline; Chap 15
Apr 4	<b>Exam # 3 Chapters 7, 8, 9, 15</b>
Apr 6	Chapter 12 (12.1-12.3): DNA Mutations and Repair Part I
Apr 9	Mastering Genetics Homework due, 11:59 pm deadline; Chap 12 Part I
Apr 11	Chapter 12 (12.4-12.6): DNA Mutations and Repair Part II
Apr 13	Chapter 17: Recombinant DNA Technologies
Apr 14	Mastering Genetics Homework due, 11:59 pm deadline; Chap 12 Part II
Apr 16	Mastering Genetics Homework due, 11:59 pm deadline; Chap 17
Apr 18	Mitochondrial DNA (19.1-pg 658, 19.3) <u>Group Work: TBA</u>
Apr 20	Chapter 22 (22.1-22.3): Population Genetics Part I *Case Study Homework due
Apr 21	Mastering Genetics Homework due, 11:59 pm deadline; Chap 19
Apr 23	Mastering Genetics Homework due, 11:59 pm deadline; Chap 22 Part I
Apr 25	Chapter 22 (22.1-22.3): Population Genetics Part II
Apr 27	Preceptor In Class Review Session
Apr 28	Mastering Genetics Homework due, 11:59 pm deadline; Chap 22 Part II
May 2	<b>Exam # 4 Chapters 12, 17, 19, 22</b>