SYLLABUS FOR BIOL203: Molecular Biology and Genetics-SPRING 2021

Online course, Lecture times T-Th, 5:35-6:50 on Blackboard Collaborate.

Instructors

Professor Carmen Melendez-Vasquez
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Unless otherwise notified, office hours will be held online on Blackboard Collaborate or Zoom by appointment only during the following days/times:

Prof. Melendez: Tuesday, between 9-11 AM

Prof. Loayza: Wednesday, between 3-5 PM.

There will be tutoring sessions available every week for all lecture materials.

These sessions will be held by Xin Xin (Samantha) Xing. Days and times to be determined.

Lecture Times:

Tuesday and Thursday, 5:35-6:50 PM on Blackboard Collaborate.

Course outline

This course includes a detailed examination of the fundamental principles of gene expression. The processes of DNA replication, transcription, mRNA processing, and translation will be extensively covered. Prokaryotic and eukaryotic systems will be described. Classical Mendelian as well as molecular genetics principles will be covered in the lecture through a discussion of several model systems. Important genetic processes such as recombination, transposition and DNA repair will be discussed in-depth. The course will provide a modern view of the concept of the gene, and gene transcriptional and post-transcriptional regulatory mechanisms. Hands-on laboratory experiments will reinforce bacterial and eukaryotic genetic concepts as well as provide basics in recombinant DNA technology.

Course format:

The lectures will be based on assigned textbook readings as detailed in the semester schedule, attached. Students are advised to prepare for each lecture by reading the required chapters and by examining the lecture slides, provided through the course's Blackboard (Bb) site. A few additional reading assignments may be given. The lectures will be given synchronously using the Blackboard Collaborate tool, and recorded. The recorded lectures will be made available on Blackboard for review and students who cannot attend during the regular lecture times. Attendance during the scheduled lecture times and use of the camera are optional.

Homework will be assigned each week and will be due usually each Monday by midnight (see course calendar for exact due dates).

The topics and activities part of the laboratory sessions will reinforce bacterial and eukaryotic genetic concepts as well as provide basics in recombinant DNA technology. All laboratory session will occur online, synchronously with your normally scheduled section (e.g. for section L01: Mondays, 8:10-12:00). Attendance to your laboratory section is mandatory, as well as the use of the camera during the session. An absence at a lab session will be recorded by your TA. Any unexcused absence to a lab session will lead to a penalty on your lab report. There will be laboratory exercises coordinated with the topics covered in class. The exercises will be due at three dates during the semester, along with lab reports. Please consult the documentation part of the lab manual available to you on the 203 Lab folder on the course's Blackboard site.

The final grade will be based on:

1. Two midterm exams (20% each). The dates are March 04th for Midterm 1, and April 15th for midterm 2.

2. A final exam (30%), cumulative, during the final exam session, on May 25th, 5:20PM - 7:20PM. Consult the schedule at the end of this document for lectures included in each exam.

3. Weekly, graded homework assignments (10%). There will be 13 assignments (one is simply a login assignment). Each assignment is due usually on a Monday before midnight. The dates for each assignment are indicated on the lecture calendar shown on the last page. These assignments require your purchasing and logging in to the 'Mastering Genetics' resource from the publisher, Pearson Education Inc. (bundled with the textbook, see below). We will instruct you on how to do this during the first lecture.

4. Lab attendance and lab reports (20%). There will be 4 lab reports during the semester. Lab reports 1,2 and 4 are worth 100 points each, and lab report 3 is worth 50 points. There will exercises to be discussed during the lab session, which will have to be turned

in along with lab reports. These exercises are designed to help you prepare for each exam and are part of the lab grade.

We will provide detailed instructions on the expected content and format of the lab reports. The lab reports must be the result of your own work: plagiarism is not tolerated and will be reported to Hunter's Office for Academic Integrity. Plagiarism is easily noticed, so do make sure that you do not use someone else's work, and do not allow anyone to copy your lab reports: both the student whose work is copied and the student copying will be reported to the Office of Academic Integrity.

Missing exams, lab reports and make-up policy:
Failure to appear for a mid-term exam will result in a grade of 0. Missing lab reports shall be given a grade of 0.

Make-up exams will only be administered to those students with a documented emergency, deemed acceptable by the instructors, and only in extreme cases. Communication of such exceptional circumstances will have to be made by email to the instructors, and ahead of the exam or due dates.

Important: **The withdrawal deadline for Spring 2019 courses is May 17th, 2021**. You will have to decide whether to take a W based on the scores available to you at that time. You are encouraged to discuss your options with the instructors and your TA ahead of time if you are considering withdrawing from the class.

Pre-requisite
BIOL100 and 102 or equivalent, and general chemistry I and II (lecture + lab), corresponding to CHEM102, CHEM104 and CHEM106 at Hunter.
Students should have basic knowledge in DNA and protein structure, gene expression, mitosis, meiosis and chromosome transmission, at the level of a general introductory Biology class. Students are highly encouraged to review these concepts in a fundamental Biology textbook prior to the semester's start.
Specifically, students are advised to review the relevant chapters covered in BIOL100:

•Unit one: p.77-89 (polypeptides-nucleic acids), Chapter 12, and Unit three (Chapters 13-21) in:

"BIOLOGY" 8th ed., Campbell & Reece, Pearson Cummings ed.

or:

• Part 2, Ch. 7-14, in "Principles of Life", Hillis, Sadava, Heller, Price, Freeman & Co.

or:

equivalent material, covering nucleic acids, proteins, mitosis, meiosis,

basics in chromosomal inheritance, and fundamentals in gene expression, in other texts.

Learning outcomes

1. Describe the multiple processes associated with gene expression and regulation in prokaryotic and eukaryotic systems.
2. Use fundamental genetic concepts to determine the heritability of traits and to develop gene linkage maps.
3. Answer questions regarding gene function by applying appropriate methods in forward and/or reverse genetics.
4. Compare the structures of DNA and RNA and associate each with their roles in gene expression.
5. Use an understanding of DNA and RNA structure to carry out techniques in recombinant DNA technology (e.g. DNA cloning, siRNA design, gene knock-outs, etc.)
6. Evaluate and interpret datasets obtained through experimentation.

How to succeed:

Review the material distributed via Blackboard ahead of time and read the book chapters in a timely fashion. The distributed material includes (but is not limited to) the slides used during the lecture. By reviewing these materials, students should come to class prepared, will have a good overall vision of the topic that will be covered in class, and will be ready to take notes on the slides (arriving at class with a printout of 4 slides/page works well to this effect). The class and tests focus on understanding and logic, rather than on pure memorization. Do not wait for the week of the exam to review. Ask questions and study! A little bit of reviewing, studying and discussion (see office hours policy), every week, over the course of the semester, is a much better strategy than to study the material all at once. Students who study for the exams exclusively during the 2-3 days before the exam date do not do well. We have also found that the highest-scoring students are also those who attend every class.

Required Text:

PLEASE NOTE: you need to purchase BOTH the book AND the access card. Make sure your ISBN matches the one shown below. The book alone has another ISBN.

It is essential that you purchase access to the companion web resource called Mastering Genetics (the “access card”). The bundled version gives you an access code to Mastering Genetics. We will give you instructions on how to register to the site in class.

MasteringGenetics, bundled with Genetic Analysis: An Integrated Approach. Third Edition.

Mark F. Sanders and John L. Bowman

Editor: Pearson Education, Inc.

If you want the hardcover, bundled with the Mastering Genetics access code, here is the ISBN:

ISBN-13: 978-0134807799

This is the link on the Amazon bookstore for your information, but you may use any supplier you prefer, and pick the textbook format: Hardcover, Paperback, Loose Leaf or eText:

https://www.amazon.com/Genetic-Analysis-Integrated-Approach-Mastering/dp/0134807790/ref=sr_1_4?dchild=1&keywords=bowman+genetics&qid=1608688476&s=books&sr=1-4

You may also purchase the access card separately from the publisher, Pearson ed., and you will have the opportunity to do that on your first Login, if you wish to purchase the Mastering Genetics code (for homework) separately.

The book and access card are available at the Shakespeare bookstore.

Note: required homework assignments will be made and graded through MasteringGenetics.

Academic Dishonesty

Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The College is committed to enforcing CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures.

Special Accommodations

In compliance with the American Disability Act of 1990 (ADA), Hunter College is committed to ensuring educational parity and accommodations for all students with documented disabilities and/or medical conditions. It is recommended that all students with documented disabilities (Emotional, Medical, Physical and/ or Learning) consult the Office of AccessABILITY located in Room E1124 to secure necessary academic accommodations. For further information and assistance please call (212- 772- 4857)/TTY (212- 650- 3230). The website for Hunter's AccessABILITY is: http://www.hunter.cuny.edu/studentservices/access/welcome

Hunter College Policy on Sexual Misconduct

In compliance with the CUNY Policy on Sexual Misconduct, Hunter College reaffirms the prohibition of any sexual misconduct, which includes sexual violence, sexual harassment, and gender-based harassment retaliation against students, employees, or visitors, as well as certain intimate relationships. Students who have experienced any form of sexual violence on or off campus (including CUNY-sponsored trips and events) are entitled to the rights outlined in the Bill of Rights for Hunter College.

Sexual Violence: Students are strongly encouraged to immediately report the incident by calling 911, contacting NYPD Special Victims Division Hotline (646-610-7272) or their local police precinct, or contacting the College's Public Safety Office (212-772-4444). All Other Forms of Sexual Misconduct: Students are also encouraged to contact the College's Title IX Campus Coordinator, Dean John Rose (jtrose@hunter.cuny.edu or 212-650-3262) or Colleen Barry (colleen.barry@hunter.cuny.edu or 212-772-4534) and seek complimentary services through the Counseling and Wellness Services Office, Hunter East 1123.CUNY Policy on Sexual Misconduct Link: http://www.cuny.edu/about/administration/offices/la/Policy-on-Sexual-Misconduct-12-1-14-with-links.pdf

Lecture Schedule, Biol 20300 **Melendez (CMV) & Loayza (DL)**
Spring 2021

Lecture	Date	Hwk due (by midnight on date indicated)	Topics (subject to change)	Chapter readings	
1	Tues, 2/2	1)Saturday, 2/6 (Login)	Course description & start of DNA structure	1&7	DL
2	Thurs, 2/4	2)Monday, 2/8 (lecture 1&2)	DNA structure & replication	7	DL
3	Tues, 2/9		Transcription and mRNA processing	8	DL
4	Thurs, 2/11	3)Monday, 2/15 (lectures 3&4)	Transcription and mRNA processing, cont.	8	DL
5	Tues, 2/16		Translation	9	DL
6	Thurs, 2/18	4)Monday, 2/22 (lectures 5&6)	Cell division and chromosome heredity	3, 10.1, 10.6, pp. 543-545	DL
7	Tues, 2/23		Transmission genetics	2	DL
8	Thurs, 2/25	5)Monday, 3/1 (lectures 7-8)	Same as above	2	DL
9	Tues, 3/2		Gene interactions	4	DL
	Thurs, 3/04		**FIRST MID-TERM EXAM (lectures 1-8)**		
10	Tues, 3/9		Linkage and mapping in eukaryotes	5	DL
11	Thurs 3/11	6)Monday, 3/15 (lectures 9,10,11)			
12	Tues, 3/16		Genetic analysis in prokaryotes	6	DL
13	Thurs, 3/18	7)Monday, 3/22 (lectures 12&13)	Gene regulation in prokaryotes	12	DL
14	Tues, 3/23		Gene regulation in eukaryotes	13	CMV
15	Thurs, 3/25	8)Monday, 3/29 (lectures 14&15)	Gene regulation in eukaryotes, cont.	13	CMV
	3/27-4/4		SPRING BREAK		

Lecture Schedule, Biol 20300 **Melendez (CMV) & Loayza (DL)**

Spring 2021

16	Thurs, 4/8	9)Monday, 4/12 (lectures 16&17)	Mutations, DNA repair, Homologous recombination	11, pp546-548	CMV
17	Tues, 4/13		Same as above		CMV
	Thurs, 4/15		**SECOND MID-TERM EXAM (lectures 9-17)**		
18	Tues, 4/20		Chromosome aberrations and transposition	10	CMV
19	Thurs, 4/22	10)Monday, 4/26 (lectures 18,19,20)	Same as above	10	CMV
20	Tues, 4/27		Forward and reverse genetics	14, 15	CMV
21	Thurs, 4/29	11)Monday, 5/3 (lectures 21&22)	Forward and reverse genetics, cont.	14, 15	CMV
22	Tues, 5/4		Same as above	14, 15	CMV
23	Thurs, 5/6	12)Monday, 5/10 (lectures 23&24)	Developmental genetics	18	CMV
24	Tues, 5/11		Same as above	18	CMV
25	Thurs, 5/13	13)Monday, 5/17 (lectures 25&26)	Same as above	18	CMV
	Date Tue 5/25/21	**5:20pm – 7:20pm**	**FINAL EXAM (lectures 18-26)**		CMV