SYLLABUS FOR BIOL203: Molecular Biology and Genetics- Summer 2021

Course info:

Instructor: Claudia Cosentino (cc3406@hunter.cuny.edu)
Office Hours: Saturday 9:30 am to 10:30 am by video conference- Please email ahead of time to sign up for the online office hours.
Lab coordinator: M.K.Razib (MRazib@GENECTR.HUNTER.CUNY.EDU)
Classes: This course will be taught and administered exclusively online due to College COVID-19 policy. This includes lectures and lab portions of the course. Exams and timed quizzes will be administered during the original class time window (Tu/Th 5:45 pm - 7:29 pm). Lecture materials will be posted weekly on Tuesday and/or Thursday.
Course dates: May 27, 2020 to August 16, 2020.

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. Laboratory activities will reinforce bacterial and eukaryotic genetic concepts as well as provide basics in recombinant DNA technology.

Course format:

Biol 203 is a synchronous online course. The lecture will be by videoconference during the allocated class time (details on how to join will be provided on Blackboard). The slides discussed during the lectures will be made available on Blackboard, the required readings are indicated in the course calendar.

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

Online laboratory experiments will reinforce bacterial and eukaryotic genetic concepts as well as provide basics in recombinant DNA technology. The laboratory exercises will be coordinated with the topics covered in class.

The final grade will be based on:

1. A **midterm exam (25%)** covering lessons 1-10.
2. A **final exam (25%)** covering material discussed after the midterm.
3. Weekly, graded **homework assignments (10%).** There will be 9 assignments (one is simply a login assignment). Each assignment is due by 11:59 pm on the due date. The dates for each assignment are indicated on the lecture calendar shown on the last page. These assignments require the 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 if you have problems doing it on your own.
4. **There will be two quizzes (20%).** The first one will be before the midterm and the second one in the second part of the course. The tentative dates and topics covered can be found in the course calendar.
5. **Lab activities (20%).** There will be two lab reports for 100 each. There will be exercises distributed online and due to your TA at dates and times TBD. These will be graded and count toward your lab grade. There will be additional online activities related to the bioinformatics part of the lab sessions, at the end of the semester.

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.

Midterm and final exam

Exams are not cumulative; consult the schedule at the end of this document for lectures included in each exam. The tentative date for the midterm is **Tuesday July 6**, and the final exam will be on **Thursday August 12.** Exams will be given online using the course's Blackboard site exam tool.

More details on the duration and modality of administration of the exams will be on provided on Blackboard.

There will be no make-up mid-term or final exam. Failure to complete any of the exams in the indicated time frame will result in a grade of 0. Missing lab reports shall be given a grade of 0.

A make-up midterm or final exam will only be administered to those students with a documented emergency, deemed acceptable by the instructors, and only in extreme cases.

Pre-requisite

-BIOL100 and 102 or equivalent

-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" 8_{th} 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 and read the book chapters in a timely fashion. 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. 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. Most importantly do not hesitate to ask questions either via email or in class, if a topic is not clear and/or to sign up for office hours.

Required Text:

MasteringGenetics, bundled with Genetic Analysis: An Integrated Approach. Third Edition. Mark F. Sanders and John L. Bowman
Editor: Pearson Education, Inc.

PLEASE NOTE: you need to purchase BOTH the book AND the access card and make sure the *ISBN-13* is *978-0134807799*. The book alone has another ISBN.

The loose leaf version is also available. You may have to purchase the access card separately from the publisher.

The book and access card are available at the Shakespeare bookstore, from the publisher's site www.mypearsonstore.com, from other online retailers (Amazon, Barnes and Noble etc.).

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

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. The instructions on how to register to the site will be posted on BlackBoard.

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

Video and recording during classes

Please be aware that the instructors in this course might require that the camera and audio be on during class sessions.

Classes may be recorded by the instructor, solely for the purpose of creating a record for students enrolled in the class to refer to, including those enrolled students who are unable to attend live. Students who participate in this class with their camera on or use a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live.

Tentative Lecture Schedule, Biol 20300 Summer 2021

Major changes in the schedule will be communicated on BlackBoard.

Lecture	Date	Homework due date (11:59 pm)	Topics (subject to change)	Chapter readings
1	Thurs, 5/27	Fri 6/4 (Login)	Course description & start of DNA structure	1&7
2	Tue, 6/1		DNA structure & replication	7
3	Thurs, 6/3	Wed 6/9 (lecture 1,2 &3)	Transcription and mRNA processing	8
4	Tue, 6/8		Translation and Gene regulation in eukaryotes	9, 13
5	Thurs, 6/10	Mon 6/14 (lectures 4&5)	Gene regulation in eukaryotes cont.	13
6	Tue, 6/15		**QUIZ 1 (lectures 1-5)** and Cell division and chromosome heredity	3, 10.1, 10.6
7	Thurs, 6/17		Cell division and chromosome heredity	3, 10.1, 10.6, pp. 543-545
8	Tue, 6/22	Mon 6/28 (lectures 6, 7&8)	Transmission genetics	2
	Thurs, 6/24		Monday Schedule	
9	Tue, 6/29		Transmission genetics cont.	2
10	Thurs, 7/1	Wed 7/7 (lectures 9&10)	Gene interactions	4
11	Tue, 7/6		**MIDTERM EXAM (lectures 1-10) starts at 5:45pm**	

12	Thurs, 7/8		Linkage and mapping in eukaryotes	5
13	Tue, 7/13		Mutations, DNA repair, Homologous recombination	11, pp546-548
14	Thurs, 7/15	Mon, 7/19 (lectures 12 & 13)	Chromosome aberrations and transposition	10
15	Tue, 7/20		Sickle cell anemia: phenotype to gene	Review: 1.4, 5.5, 7.5
16	Thurs, 7/22	Mon, 7/26 (lectures 14, 15&16)	Genetic analysis in prokaryotes	6
17	Tue, 7/27		Gene regulation in prokaryotes	12
18	Thurs, 7/29	Mon, 8/2 (lectures 17&18)	**QUIZ 2 (lectures 12-16)** and Forward and reverse genetics	14, 15
19	Tue, 8/3		Forward and reverse genetics, cont.	14, 15
20	Thurs, 8/5	Mon, 8/9 (lectures 19&20)	Developmental genetics	18
21	Tue, 8/10		Developmental genetics	18
22	Thurs, 8/12		**FINAL EXAM (lectures 12-21) starts at 5:45pm**	