

This syllabus is provided as a general informational guide. Some of the information may vary depending on the specific course section and instructor. Different sections of the same course may require different textbooks. Verify the section specific textbook information in the CUNY's Academic Course Schedule Web Page. Modifications of the grading system presented here will be communicated by the instructors of the sections when they meet the class.

Spring 2021 Bio 240

BOROUGH OF MANHATTAN COMMUNITY COLLEGE

The City University of New York
Department of Science

Title of Course Genetics **Class Hours** Tue and Thur: 5:00-7:45 PM (Zoom)

BIO 240 **Laboratory Hours per Week** 3

Semester Spring 2021 (online)

Instructor Information Office N698k, email: nvanloon@bmcc.cuny.edu

Credits 4

Course Description A one-semester introduction to molecular and classical genetics

Basic Skills MAT 056

Prerequisites BIO 220

Corequisites CHE 202 or departmental approval

Course Student Learning Outcomes (Students will be able to...)	Measurements (means of assessment for student learning outcomes listed in first column)
1. Understand the basic concepts and rules of inheritance and express themselves knowledgeably on these concepts	1. classroom discussions, homework , exams, research paper
2. Correctly perform techniques and use equipment commonly found in molecular biology laboratories	2. practical quizzes, practical laboratory exams
3. Evaluate the accuracy and veracity of media statements relating to genetics	3. classroom discussions, homework, exams, research paper
4. Extract useful information about genetics from Internet sources, analyze and evaluate available information	4. homework, research paper
5.	5.

What makes this course a Writing Intensive Course?

This is a Writing Intensive course that fulfills the WI requirement for graduation. Writing intensive courses pay special attention to developing critical reading, writing, and analytic skills to prepare students for college-level coursework in general. Both informal and formal writing will be designed to maximize your understanding of the subject matter. Formal writing assignments, at least 10-12 pages total, account for a significant portion of your grade and will include opportunities for revision.

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Below are the college's general education learning outcomes, the outcomes that are checked in the left-hand column indicate goals that will be covered and assessed in this course. (Check at least one.)

	General Education Learning Outcomes	Measurements (means of assessment for general education goals listed in first column)
<input type="checkbox"/>	Communication Skills- Students will be able to write, read, listen and speak critically and effectively.	Essay questions on exams, research paper
<input type="checkbox"/>	Quantitative Reasoning- Students will be able to use quantitative skills and the concepts and methods of mathematics to solve problems.	Homework and exams in which students are required to use quantitative skills: Chi square test, binomial theorem
<input type="checkbox"/>	Scientific Reasoning- Students will be able to apply the concepts and methods of the natural sciences.	Research paper, homework, laboratory reports
<input type="checkbox"/>	Social and Behavioral Sciences- Students will be able to apply the concepts and methods of the social sciences.	
<input type="checkbox"/>	Arts & Humanities- Students will be able to develop knowledge and understanding of the arts and literature through critiques of works of art, music, theatre or literature.	
<input type="checkbox"/>	Information & Technology Literacy- Students will be able to collect, evaluate and interpret information and effectively use information technologies.	Assignments using the National Center for Biotechnology Information: Pubmed, Genbank
<input type="checkbox"/>	Values- Students will be able to make informed choices based on an understanding of personal values, human diversity, multicultural awareness and social responsibility.	Discussion of social and ethical ramifications of technological advances in genetics: sex selection for embryos, gene therapy, right to know, right not to know, etc.

Required Text Genetics a Conceptual Approach 7th Ed 2020, by Benjamin Pierce

Other Resources Laboratory handouts on Blackboard, Labster simulations, TED Ed video lessons, etc.

Use of Technology (If Applicable) Blackboard, Turnitin, Voicethread

Evaluation and Requirements of Students

Class Participation

Participation in the academic activity of each course is a significant component of the learning process and plays a major role in determining overall student academic achievement. Academic activities may include, but are not limited to, attending class, submitting assignments, engaging in in-class or online activities, taking exams, and/or participating in group work. Each instructor has the right to establish their own class participation policy, and it is each student's responsibility to be familiar with and follow the participation policies for each course.

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BMCC is committed to the health and well-being of all students. It is common for everyone to seek assistance at some point in their life, and there are free and confidential services on campus that can help.

Single Stop www.bmcc.cuny.edu/singlestop, room S230, 212-220-8195. If you are having problems with food or housing insecurity, finances, health insurance or anything else that might get in the way of your studies at BMCC, come by the Single Stop Office for advice and assistance. Assistance is also available through the Office of Student Affairs, S350, 212-220- 8130.

Counseling Center www.bmcc.cuny.edu/counseling, room S343, 212-220-8140. Counselors assist students in addressing psychological and adjustment issues (i.e., depression, anxiety, and relationships) and can help with stress, time management and more. Counselors are available for walk-in visits.

Office of Compliance and Diversity www.bmcc.cuny.edu/aac, room S701, 212-220-1236. BMCC is committed to promoting a diverse and inclusive learning environment free of unlawful discrimination/harassment, including sexual harassment, where all students are treated fairly. For information about BMCC's policies and resources, or to request additional assistance in this area, please visit or call the office, or email olevy@bmcc.cuny.edu, or twade@bmcc.cuny.edu. If you need immediate assistance, please contact BMCC Public safety at 212-220-8080.

Office of Accessibility www.bmcc.cuny.edu/accessibility, room N360 (accessible entrance: 77 Harrison Street), 212-220-8180. This office collaborates with students who have documented disabilities, to coordinate support services, reasonable accommodations, and programs that enable equal access to education and college life. To request an accommodation due to a documented disability, please visit or call the office.

BMCC Policy on Plagiarism and Academic Integrity Statement

Plagiarism is the presentation of someone else's ideas, words or artistic, scientific, or technical work as one's own creation. Using the idea or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotations, require citations to the original source. Plagiarism may be intentional or unintentional. Lack of dishonest intent does not necessarily absolve a student of responsibility for plagiarism. Students who are unsure how and when to provide documentation are advised to consult with their instructors. The library has guides designed to help students to appropriately identify a cited work. The full policy can be found on BMCC's Web site, www.bmcc.cuny.edu. For further information on integrity and behavior, please consult the college bulletin (also available online).

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Bio 240 Lecture and Laboratory Schedule.

Lect/ Lab#	Textbook Chapter	Lecture	Laboratory Topics (Topic order and content may be modified)
1	1	History of genetics, types of genetics, ideas that led to modern genetics: Theory of evolution, cell theory, germplasm theory, natural vs artificial selection	Labster Demo Labster: Laboratory Safety handout: DNA Isolation from Strawberries, an Informal Method Handout: Finding Topics for your Research Paper Handout: Looking for References for your Research Paper (NCBI-PMC, GeneCards) Topics: DNA Isolation: informal
2	10 19	DNA and RNA as carriers of genetic information, structure of DNA	Handout: Using Micropipetters Ppt. Gel Electrophoresis Ch 19: Viewing DNA Fragments) Topics: How to Use a Micropipette, Running an Agarose Gel
3	17.1, 17.2 21	Control of Gene Expression in Eukaryotes Epigenetics	Ppt. Restriction Enzymes Handout: Isolation and Purification of DNA in the Laboratory Handout: Restriction Digestion of DNA Topics: DNA Isolation and Purification with Lab Instruments, Setting up a Restriction Digestion Reaction, Restriction Digestion Analysis
4		Exam 1 TED Ed: Endosymbiosis in Salamanders	Handout: ChromataChIP kit Handouts: Sonication, ChIP: washing and elution, Nomogram for Computing Relative Centrifugal Forces Topic: Chromatin Immunoprecipitation Labster: ChIP Exo

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5	11.1, 11.2,11.4 2.1, 2.2, 2.3	Chromosome structure levels, centromeres and telomeres Organelle DNA, endosymbiotic theory, evolutionary rates in nuclear, mitochondrial and chloroplast DNA Mitosis and meiosis, meiosis in mammals and angiosperms	Ppt. Bacterial Transformation Handout: Bacterial Transformation Topics: DNA Transformation, Three-Parent In- Vitro Fertilization
6	12	DNA Replication Prokaryotes TED Ed: Meselson and Stahl Experiment	Ppt. Protein Electrophoresis: SDS-PAGE Topics: Freeze-lysing <i>E. coli</i> , Setting up and Running Mini Protean apparatus, Analysis of GFP by SDS-PAGE
7	12	DNA Replication Eukaryotes, Telomerase, Recombination TED Ed: DNA Recombination	Ppt. Polymerase Chain Reaction Topic: Alu PV92 Detection by PCR
8	13 25	Transcription, RNA World Promoters, transcription initiation and transcription termination in prokaryotes Genetic Equilibrium in Populations	Exam 2 Topic: The Hardy-Weinberg Theorem Labster: Gene Regulation
9	13 17.3	Assembly of transcription initiation apparatus in eukaryotes Transcription regulation, transcription factors, activators, coactivators TED Ed: 3D Map of Human Genome	Handout: Mono, Di Crosses, Punnett Square, X- linked Traits Labster: Mendelian Genetics: From Genes to Traits
10	14 22	RNA processing, alternative splicing, gene editing, Developmental Genetics	Handout: Mono, Di and Three-Character Crosses: Branching Method Topic: Effects of Homeotic genes on <i>Drosophila</i> Development
Lect/Lab#	Chapter	Lecture	Laboratory
11		Exam 3	CRISPR applications

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		TED Ed: CRISPR: Gene Editing and Beyond	Topic: SHERLOCK: A CRISPR Tool to Detect Disease Discussion Board: Science Explains CRISPR
12	14	RNA Interference, microRNAs, small interfering RNAs, CRISPR Handout: Snapshot: Spliceosome Dynamics I TED Ed: RNA Splicing: Spliceosome Animation	Mendelian Genetics Handout: A Little Bit of Everything Exercises for Chapter 3 Handout: Chi Square Problem with Cats Topic: RNA Interference
13	15	Ppt. Ch 15: Protein Synthesis TED Ed: Translation	Binomial Expansion and Probability Handout: Binomial Expansion and Chi Square Handout: Binomial Expansion Practice (Breakout Rooms Exercise)
14	3	Mendelian Genetics Monohybrid, dihybrid cross, multiplication, addition rules, dominance, segregation, independent assortment	Exam 4
15		Final Exam	