

GENETICS (BIO319)

Fall 2017

M/W/F 10am Hochstetter 114 3 credits

Prerequisites	BIO201 (Cell Biology) and BIO205 (Biochemistry) If you haven't done well in both of these courses, you won't pass this one.
Instructors	Dr. Paul Gollnick (Course Coordinator) gollnick@buffalo.edu Hochstetter 609 Office hours: 11-noon, MWF Dr. Denise Ferkey dmferkey@buffalo.edu Cooke 353 Office hours: 11am – 1pm, Friday
Description	This class provides students with a thorough grounding in the fundamentals of classical and molecular genetics. Topics to be covered are listed in the course outline below.
Text	<i>Genetics Analysis & Principles, 6th edition</i> by Brooker (ISBN 978-1-259-61602-0)
Problem sets	Problem sets will be assigned from each chapter. They will not be graded. Answers to the even-numbered questions are in the back of the book. We will post an answer key for any odd-numbered questions that we assign. It will be to your advantage to do and understand the problem sets. Several questions on each exam are often directly from or based upon questions in the problem sets.
Attendance	Attendance is not taken during class. <u>However, the lectures always contain information that the text does not. Exam questions are based on information from lectures.</u> Regardless of whether you are present, you are responsible for all material presented during the lecture.

Safe Space: It is critical to us that this classroom is a safe place that encourages learning for all students. We expect all students to be respectful of fellow learners regardless of race, ethnicity, citizenship, age, disability, gender, religion, sexual orientation or gender identity. Any type of harassment is against UB's Discrimination and Harassment Policy and will be reported as such. Please email us or make an appointment to speak with us if you have questions or concerns about this policy or about incidents in the classroom.

Exams

There will be three exams during the semester and one final exam for a total of four exams, each worth 100 points. Exams will be given on the **EVENING** of the dates listed on the syllabus. Every exam will be 1.5 hours long. The exam locations are given on the syllabus. You **must** take the exams on these evenings. We will not accept excuses other than documented medical illness (see below). The final exam date and location will be announced later. **You must take the final exam at the scheduled time. Do not make plans to leave town before finals are over. The final will not be given at any time other than then one scheduled by the university.**

You must show up on time for the exams. Students coming in late to an exam will **not** be allowed extra time to finish. Once one student has finished and left the examination room, no other students will be allowed to begin the exam.

If you are too ill to take an exam, you must notify the professor in charge of the exam by email or phone within 24 hours of the exam time. A valid medical excuse will be accepted **at the instructor's discretion ONLY if you notify the instructor within 24 hours** of the exam. A written medical excuse must be presented if the student wishes to make up the exam. The excuse will be checked, so be sure to give the medical examiner permission to talk to us and write his/her phone number on the excuse. Make-up exams are usually oral. However, the format is at the instructor's discretion.

Academic Integrity You are welcome to work with other students while studying for the exams and working on homework. However, there are limits to your collaborations. **Academic dishonesty of any kind, including cheating on exams in any fashion whatsoever, will result in an F.**

The url for UB's academic integrity policy can be found here:
<http://undergrad-catalog.buffalo.edu/policies/course/integrity.shtml>

Calculators You will **not** be allowed to use calculators.

Cell phones Cell phones are not allowed to be out during exams. No exceptions.

Review sessions Review sessions will be held during the class period on the day of each exam.

Re-grading Exams Simple questions regarding point totals on exams, such as addition errors, will be handled on an individual basis **first** with the grader, then the instructor. Questions regarding interpretations of answers must be submitted **in writing** within one week of the return of graded exams. **We will regrade the entire exam**, not just the question that you want regraded. This means that you could get more points for the particular question but actually get a lower total for the whole test if you lose points on other questions. **Think carefully and check the answer key before asking for a regrade.**

Grading Policies

In general, grading will follow the **Undergraduate Grading Policy** as defined by the Vice Provost for Undergraduate Education.

Plus and Minus grades will be given. Grades will be assigned on a curve based on the mean of each exam. Scores of 90-100 are guaranteed to be in the A range, 80-89 in the B range, etc. However, if the mean score on an exam is less than 75%, the cutoffs for each grade will be lowered accordingly. Under no circumstances will the cutoffs be raised. .

November 13 is the last day a student may resign from a course and receive an R grade. After this date do not ask us for a resignation; we can not give you one.

Incomplete grades can only be given in cases where a student is unable to complete the course due to severe unforeseen problems. The reason a student wishes to receive an I must be documented. **The student must be receiving a passing grade** in the class at the time the I is issued. The student will be given up to 15 months to complete **only that portion of the work that was not completed**. An I grade does not allow you to "start over" next year.

The website for UB's policy on receiving an I is found here:

<http://undergrad-catalog.buffalo.edu/policies/grading/explanation.shtml#incomplete>

Accessibility

If you have a diagnosed disability (physical, learning or psychological) that will make it difficult for you to carry out the course work as outlined, or requires accommodations such as note takers, readers or extended time on exams, please contact the Accessibility Resources Office and inform one of the instructors within the first two weeks of the course so that we may review possible arrangements.

The url for UB's Accessibility Resources Office can be found here:

<http://www.buffalo.edu/accessibility/>

BIO319 COURSE OUTLINE

This outline is tentative. Only the exam dates are certain.

<u>Date</u>	<u>Topic</u>	<u>Chapter</u>
Aug 28 (DMF)	Genes, heredity and nucleic acid structure	1, 9.1-9.6
Aug 30 (DMF)	Chromosomes, mitosis, meiosis	3.1-3.4
Sept 1 (DMF)	Mendelian inheritance	3.5, 2.1-2.2
Sept 6 (DMF)	Mendelian inheritance	2.3, 2.5
Sept 8 (DMF)	Dominant and recessive alleles	4.1-4.4, 4.7-4.8
Sept 11 (DMF)	Sex chromosomes and inheritance patterns	2.4, 3.6, 4.5-4.6, 25.1
Sept 13 (DMF)	Non-Mendelian inheritance	5
Sept 15 (DMF)	Genetic linkage and recombination	6.1-6.2
Sept 18 (DMF)	Genetic mapping	6.3, 22.3, 25.2
Sept 20 (DMF)	Gene interactions and complex traits	4.9, 28.1, 28.3
(end of material for Exam 1)		
Sept 22 (DMF)	Review session during class	
	Exam 1 (covering lectures Aug 28 - Sept 20 by Dr. Ferkey)	
	5:00-6:30pm	
Sept 25 (PG)	Replication	11
Sept 27 (PG)	Replication	11
Sept 29 (PG)	Recombination mechanisms	20
Oct 2 (PG)	Transcription in bacteria	12
Oct 4 (PG)	Transcription in bacteria	
Oct 6 (PG)	Translation	13
Oct 9 (PG)	Translation	
Oct 11 (PG)	Gene regulation - <i>lac</i> operon (repression and activation)	14
Oct 13 (PG)	Gene regulation - <i>lac</i> operon (cis and trans regulators)	14
Oct 16 (PG)	Gene regulation - <i>trp</i> operon (repression)	14
Oct 18 (PG)	Gene regulation - <i>trp</i> operon (attenuation, and riboswitches)	14
(end of material for Exam 2)		
Oct 20 (PG)	Review session during class	
	Exam 2 (covering lectures Sept 25 - Oct 18 by Dr. Gollnick)	
	5:00-6:30pm	
Oct 23 (PG)	Gene regulation (Phage Lambda)	18.3
Oct 25 (PG)	Gene regulation (Phage Lambda)	18.3
Oct 27 (PG)	Eukaryotic promoters & polymerases	12
Oct 30 (PG)	Eukaryotic gene expression	15
Nov 1 (PG)	Eukaryotic gene expression	15
Nov 3 (PG)	RNA splicing & editing	12
Nov 6 (PG)	RNA splicing & editing	12
Nov 8 (PG)	Eukaryotic translation	17
Nov 10 (PG)	Post-transcriptional regulation of eukaryotic gene expression	17
(end of material for Exam 3)		
Nov 13 (DMF)	Epigenetic control of gene expression	15.3, 15.4, 16.1, 16.2, 16.4
Nov 15 (DMF)	Small RNAs and RNAi-related mechanisms	17.1, 17.3, 17.6
Nov 17 (PG)	Review session in class	

**Exam 3 (covering lectures Oct 23 - Nov 13 by Dr. Gollnick)
5:00-6:30 pm**

Nov 20 (DMF)	Recombinant DNA technology	21
Nov 27 (DMF)	Biotechnology and genetic engineering	22
Nov 29 (DMF)	Mutations	19.1-19.4
Dec 1 (DMF)	DNA repair	19.5
Dec 4 (DMF)	Variation in chromosome structure and number	8, 10.3
Dec 6 (DMF)	Cancer genetics	25.5
Dec 8 (DMF)	Population genetics	27.1-27.3
	(end of material for Exam 4)	

**Dec 14 (DMF) Final exam (Exam 4, covering lectures Nov 13 - Dec 8 by Dr. Ferkey)
NSC 225, 7:15pm**

Department of Biological Sciences Learning Outcomes and Assessment Grid for BIO319

0 - not covered

1 - moderately covered

2 - extensively covered

Number	Program Learning Outcome	Depth	Specific Outcome Objectives	Assessment Instrument	Defined Success Level
1	Students will develop a broad background in the biological sciences and achieve an understanding and appreciation of basic biological concepts and principles. They will become proficient in five broad areas of biology: evolutionary biology, cell biology, physiology, biochemistry, and genetics.	2	Students will become familiar with basic concepts in genetics, particularly the ways in which a genotype affects and organism's phenotype.	Exam 1	At least 70% of class earns 50% of available points
2	Students will acquire laboratory and field skills necessary to answer biological questions and an ability to understand and employ scientific methodologies. They will be able to understand how to obtain, critically evaluate, and communicate experimental results.	0			
3	Students will gain understanding of how to integrate knowledge across biological sub disciplines and to synthesize examples, facts, or hypotheses from more than one level of organization into a coherent whole. They will also obtain the ability to integrate the physical sciences (chemistry, physics, and mathematics) with biology.	1	Understand how the integration of classical, molecular genetic analyses leads to a more complete understanding of complex biological processes.	Exams 1-4	At least 70% of class earns 50% of available points
4	Students will develop effective	0			

	quantitative reasoning skills and be able to operate as a scientist to formulate and test appropriate biological hypotheses. They will be engaged both independently and collaboratively in the scientific process and learn to critically evaluate the veracity and value of published information.				
5	Students will be able to retrieve information from multiple sources, to analyze this information and communicate it precisely in both written and oral forms.	1	Be able to communicate an understanding of the material presented in this course in short answer and short essay exam questions.	Exams 1-4	At least 70% of the class earns 50% of available points.
6	Students will develop an interest in lifelong learning and be able to evaluate and advance knowledge in biology. Students will be exposed to current problems in biology, as well as develop an appreciation for the nature of living organisms, the mechanisms of life function, the different levels of biological organization and the interactions among organisms and their environments.	0			
7	Students will learn to appropriately place biological knowledge into an ethical context, appreciate the importance of ethical conduct in science and demonstrate knowledge of contemporary social and ethical issues related to biology and the professional responsibilities of a biologist.	0			
8	Students will complete a more advanced level of study in areas	0			

	of their choice to obtain a deeper coverage of at least one of the five broad areas.				
--	--	--	--	--	--