GENETICS (BIO319)

Fall 2016

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)
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Hochstetter 609
Office hours: 11-noon, MWF

Dr. Denise Ferkey
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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

Genetics Analysis & Principles, 5th edition by Brooker (ISBN 978-0073525341)

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. **However, the lectures always contain information that the text does not. Exam questions are based on information from lectures.** Regardless of whether you are present, you are responsible for all material presented during the lecture.

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.

Date		Topic	Chapter
Aug 29	(DMF)	Overview of genetics, genes, and nucleic acid structure	1, 9.1-9.6
Aug 31	(DMF)	Chromosomes, meiosis, inheritance	3
Sept 2	(DMF)	Mendelian inheritance	2.1-2.2
Sept 7	(DMF)	Mendelian inheritance	2.3-2.5
Sept 9	(DMF)	Extensions of Mendelian inheritance	4.1-4.4, 4.7-4.9
Sept 12	(DMF)	Sex chromosomes and sex-linked traits	3.6, 4.5, 4.6, 5.2
Sept 14	(DMF)	Human genetic traits	24.1, 27.1, 27.3
Sept 16	(DMF)	Non-Mendelian inheritance	5.1, 5.3-5.4
Sept 19	(DMF)	Genetic linkage	6.1-6.2
Sept 21	(DMF)	Genetic mapping	6.3, 22.3, 24.2
		(end of material for Exam 1)	
Sept 23	(DMF)	Review session during class **Exam 1 (covering lectures Aug 29 - Sept 21 by Dr. Ferkey)** **5:00-6:30pm NSC 225**	
Sept 26	(PG)	Recombination mechanisms	19
Sept 28	(PG)	Replication	11
Sept 30	(PG)	Replication	
Oct 3	(PG)	Transcription in bacteria	12
Oct 5	(PG)	Transcription in bacteria	
Oct 7	(PG)	Translation	13
Oct 10	(PG)	Translation	
Oct 12	(PG)	Gene regulation - *lac* operon (repression and activation)	14
Oct 14	(PG)	Gene regulation - *lac* operon (cis and trans regulators)	14
Oct 17	(PG)	Gene regulation - *trp* operon (repression)	14
Oct 19	(PG)	Gene regulation - *trp* operon (attenuation, and riboswitches)	14
		(end of material for Exam 2)	
Oct 21	(PG)	Review session during class **Exam 2 (covering lectures Sept 26 - Oct 19 by Dr. Gollnick)** **5:00-6:30pm NSC 225**	
Oct 24	(PG)	Gene regulation (Phage Lambda)	17
Oct 26	(PG)	Gene regulation (Phage Lambda)	17
Oct 28	(PG)	Eukaryotic promoters & polymerases	12
Oct 31	(PG)	Eukaryotic gene expression	15
Nov 2	(PG)	Eukaryotic gene expression	15
Nov 4	(PG)	RNA splicing & editing	12
Nov 7	(PG)	RNA splicing & editing	12
Nov 9	(PG)	Eukaryotic translation & RNA silencing	16
Nov 11	(PG)	Post-transcriptional regulation of eukaryotic gene expression	16
		(end of material for Exam 3)	
Nov 14	(DMF)	Epigenetic control of gene expression	15.3, 16.1-16.3
Nov 16	(DMF)	Small RNAs and RNAi-related mechanisms	16.4
Nov 18	(PG)	Review session in class **Exam 3 (covering lectures Oct 24 - Nov 11 by Dr. Gollnick)** **5:00-6:30 pm NSC 225**	

Nov 21	(DMF)	Recombinant DNA technology	20	
Nov 28	(DMF)	Biotechnology and genetic engineering		21
Nov 30	(DMF)	Mutations		18.1-18.4
Dec 2	(DMF)	DNA repair		18.5
Dec 5	(DMF)	Variation in chromosome structure and number		8, 10.3
Dec 7	(DMF)	Cancer genetics		24.5
Dec 9	(DMF)	Population genetics		26.1-26.3
		(end of material for Exam 4)		
Dec	(DMF)	**Final exam (Exam 4, covering lectures Nov 14 - Dec 9 by Dr. Ferkey)** **8:00-9:30am NSC 225**		

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 Sueccess 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.				