Genetics BB2920

Worcester Polytechnic Institute

C term 2017

Syllabus

Professor: Dr. Natalie Farny (nfarny@wpi.edu)

Office and Office Hours: Goddard 203C, by appointment and announced weekly in class.

Peer Learning Assistants: Ginny Massa (vemassa@wpi.edu) Shelby McQueston (smmcqueston@wpi.edu), Chloe LaJeunesse (cllajeunesse@wpi.edu), Bernat Navarro Serer (bnavarroserer@wpi.edu)

Meeting Times: Lectures M, T, R, F 3:00-3:50pm HL116; conference W 3:00-3:50pm HL116. Attendance at lectures is mandatory and class participation will count toward your final grade. Attendance at conference is optional but highly recommended. Conferences will be run by your PLAs. Conference is a great opportunity to work on practice problems and get help on problem sets from your PLAs.

Snow Day Policy: If classes are cancelled due to winter weather, the missed lecture will be made up during a conference period. Conference will then be re-scheduled to another time in the evening, to be announced.

Prerequisites: This course will take a molecular-based approach to understanding the principles of genetics. It is recommended that you have taken Introduction to Biotechnology (BB1035), or Cell Biology (BB2550) or a rigorous high school biology course in which gene expression (transcription and translation) and basic Mendelian genetics (e.g., Punnett squares, dominance and recessiveness, homo- and heterozygosity) have been covered.

Textbook: Griffiths et al Introduction to Genetic Analysis, 11th edition. A copy is on reserve at the Gordon Library. Alternatively you may choose to purchase the LaunchPad online version, which includes 6 month access to a full electronic version of the text plus access to additional online study materials at: http://www.macmillanhighered.com/Catalog/Product.aspx?isbn=9781464188053#tab. The reading assignments are required and are listed on the course schedule. Reading quizzes will be given to assess your understanding. You may use older versions (10th ed) of the text but it will be your responsibility to compare the older text with the new one to ensure you are reading the correct content. Problems from the book will be assigned for study/review purposes only. I will not include any material on the exam which is not covered in class.

Additional readings and links to online analysis tools will be posted on the Canvas course website. Some of these readings will be required for our journal club discussions (these will be noted), and others are offered as supplement to the lecture material.

Course Objectives - By the end of this course, students should be able to:

- describe the sources and consequences of genetic variation, and genetic mutation, and their relationship to human conditions, and the functional and physical relationships between genes and gene products, genotype and phenotype;
- apply knowledge of the molecular basis of genetic inheritance (DNA transcription and translation, RNA processing, and translation) to the interpretation of experimental data;
- understand modern methods of manipulating genetic material in the laboratory, and demonstrate how these methods are used to test hypotheses;
- predict and interpret the regulation of gene expression under specific physiological conditions, both in prokaryotes and eukaryotes;
- apply the tenets of Mendelian inheritance to make predictions about the outcomes of genetic crosses;
- analyze pedigrees to assess the inheritance pattern of genetic traits;

- explain how the environment of a population influences its genetic constitution;
- calculate human genetic disease risks;
- read and participate in discussion of current scientific literature.

Course policies

Attendance at lectures is mandatory, and is essential for your understanding of the material.

Course Website: A website for the course will be maintained on Canvas. Lecture slides will be posted there after each lecture. Journal club readings, reading guides and assignments, problem sets, solution sets, and practice questions will also be available on the course website. It is your responsibility to check the course website regularly. All lectures will be recorded and can be viewed on the Canvas course website.

Clickers: You will need a "clicker" response device for this course (you can borrow these from the Academic Technology Center) The ATC will come to our lecture to set up students with clickers. If you are not present when clickers are distributed, it will be your responsibility to obtain a clicker from the ATC. Please visit the ATC with questions or problems. **Please bring your clicker to EVERY lecture. You will be using it EVERY lecture. There are too many students for me to make adjustments for students that forget their clickers. If you forget your clicker you will not receive points that day. Your clicker is your responsibility. You must ensure that it is in proper working order. Concerns about the function of your clicker should be addressed to the ATC as soon as possible.**

Participation: Class participation is required, and is worth 10% of your final grade. This course is designed for students to be active and engaged in the material each and every class. Scientific studies have clearly demonstrated that his approach increases retention of the material and improves exam scores (and makes the class more fun, too!). Class participation will be assessed by clicker questions and group problems which I call "Break-Outs". In a Break-Out, I will pose problem to the class. Students will assemble in small groups (2-4 students) and work out the problem. I will then present a series of multiple choice questions about the problem. Each student will register answers using their clicker. Clicker points are assigned for participation, not correctness. Yes, that means that 10% of your final grade is just for "showing up" and working on the in-class problems with your group. You will get ~10% as "free" points, meaning that you can miss 1-2 lectures without affecting your final grade. This 10% leeway will cover any absences for minor illnesses, other course work or sports team related absences. (eg, if there are a total of 94 possible break-out points at the end of the term, I will calculate your percentage based on 85 points, so if you earn 78 points, your % will be 78/85 * 10% = 9.18 points toward your final grade). If you anticipate that you will miss more than one class, please come and discuss the situation with me immediately. Any necessary extended absences (severe illness and/or hospitalization, family emergencies, multi-day conference or meeting attendance, etc) that affect your participation grade must be validated through the Office of Academic Advising before alternative arrangements for the participation grade will be made. **There will be no make-ups for missed participation points for any reason.** Points missed for valid medical reasons (approved by myself or documented with the office of Academic Advising) will simply be excused from the total.

Reading Quizzes: The reading assignments for the course and a reading guide are posted on the course website. The reading guide will help you focus your reading on the most relevant information and key terms. Additional readings, online articles, or links to videos, outside of the book will be posted as necessary. You are expected to do the readings *before* the material will be presented in class. There will be 6 reading quizzes, which will be posted on the course website, and are worth 1% each (the lowest grade will automatically be dropped) for a total of 5% of your grade. No make-ups will be permitted for missed quizzes.

Problem Sets: Six problem sets will be assigned. The lowest grade will be dropped, and five problem sets will account for 20% of the final grade, 4% each. Problem sets are due **in class, on paper,** on the dates indicated on the syllabus. Problem sets do not need to be typed. **Late problem sets will not be accepted.** Problem sets will

be posted on Canvas, as will solutions after the due date. If you cannot be present to turn in your problem set, you must contact me **in advance** and make arrangements for submitting the problem set on time.

Grading of problem sets will be rotated among the four PLAs. While we do our best to see that all students are graded in as fair and impartial a manner as possible, sometimes discrepancies between PLA graders do occur. If you feel that you would like an explanation for the reasons why you lost points on a particular question, don't hesitate to contact me within 7 business days of the date of return of the assignment. I am more than happy to work with you to either explain why the grade must stand, or alter the grade as appropriate. The PLAs are not authorized to alter grades once they are assigned, so please bring all such inquiries directly to me. **Grades for all assignments in this course will only be reviewed within 7 business days of the date on which that graded assignment is returned to the class, so please do not wait if you have an issue with your problem set grade.**

Journal Clubs: The purpose of the journal clubs is to give you experience reading current scientific literature, and to demonstrate how the concepts we will cover in class are relevant to modern biomedical research. About a week before the journal club session, I will post the reading along with a study guide of questions to help you work through the reading. We will then discuss the reading as a class, using the study guide to direct our conversation. I expect EVERYONE to participate in these discussions. It will be impossible to participate in the discussion unless you have carefully read the assigned paper(s). Therefore, to assure you are doing the reading, there will be a quiz (on the Canvas site) based on the study guide questions. The quiz will open as soon as the readings are posted. The quiz will close just before the start of the journal club class. Each quiz will be worth 2.5% of your final grade, and the lowest of the three quizzes will be dropped. There will be no make-ups for missing the quiz. To ensure that all students participate in the classroom discussion, all students will be randomly assigned to respond to one of the questions from the reading guide during class. These assignments will be posted with the Journal Club materials. Additional details about journal clubs will be given in class.

Exam Policy: Three exams will be given on the dates indicated on the syllabus. You may not leave the room for any reason during an exam (Please plan accordingly, use the restroom before the exam begins). Attendance at all exams is mandatory. If you cannot make it to an exam, you must contact me ***IN ADVANCE*** to discuss the situation. If you must miss an exam for a valid reason (e.g., severe illness, family emergency) AND you have contacted me in advance of the exam, a make-up exam will be arranged. This accommodation will NOT be offered to students who do not have a valid excuse for missing the exam, or for students who do not contact me BEFORE the missed exam. You will receive a zero for the exam, and this will factor into your final grade. If you fail the first exam (<65%) I will send you an e-mail to invite you to meet with me and discuss your performance in the course. I do this to try and assess where and how we might help you succeed on future exams, not as a punishment! ***Exams will NOT be curved.*** If you believe that an error occurred in the grading of your exam, you must contact me as soon as possible, but not more than one week after the return of the exam, with a written explanation of your complaint.

Its flu season! If you have the flu or some other terrible illness, PLEASE DO NOT COME TO THE EXAM! Contact me (**in advance as you are able!**) and we will arrange a make-up.

Grade breakdown:	**Grade Cut-offs:**
Exam 1 - 20%	90+ = A
Exam 2 - 20%	80-89 = B
Exam 3 - 20%	70-79 = C
Reading Quizzes – 5% (6 quizzes, 1% each, lowest one dropped)	>70 = NR

Problem Sets - 20% (6, 4% each, lowest one dropped)

Journal Club Quizzes – 5% (3 quizzes, 2.5% each, lowest one dropped)

Class participation (clicker points) - 10%

The A/B cut-off for the course will be set at 90%. The B/C cut-off will be set at 80%. The C/NR cut-off will be set at 70%. ***The course will not be curved.*** NR will not be assigned by request if you are unhappy with your letter grade.

Extra credit is not currently planned and will not be generated on request for individual students. No amount of additional work at the end of the term can make up for poor performance at the beginning of the term. Work hard and plan to do well without planning on extra credit assignments to help you.

Arbitration of grades: I am perfectly willing to review any of the grades that are issued for the work you complete in this class. I am unwilling to sit with you on the last day of term to "look for points" in your assignments in the hopes of improving your grade. Therefore, **grades for all assignments in this course will only be reviewed within 7 business days of the date on which that graded assignment is returned to the class (whether or not you are present at that class). For online quizzes, grades will only be reviewed within 7 business days from the date that the quiz closes.** Again, that means I will not review earlier assignments once final grades have been submitted in order to find more points for you. If you believe that the calculation of your grade is unfair, you may at that point appeal your grade to the Campus Hearing Board.

Students with Disabilities

If you need course adaptations or accommodations because of a disability, or if you have medical information to share with me that may impact your performance or participation in this course, please make an appointment with me as soon as possible. If you have approved accommodations, please go to the Exam Proctoring Center (EPC) in Morgan Hall to arrange for electronic delivery of Letters of Accommodation. If you have not already done so, students with disabilities who need to utilize accommodations in this class are encouraged to contact the Office of Disability Services (ODS) as soon as possible to ensure that such accommodations are implemented in a timely fashion. This office can be contacted via email: DisabilityServices@wpi.edu, via phone: (508) 831-4908, or in person: 137 Daniels Hall.

Common Courtesies

Please, no texting, tweeting, snapchatting, e-mailing, Facebook, web surfing, etc. while in class. It is distracting to your fellow students. Please silence your cell phones when you enter the lecture hall.

Academic Integrity

Cheating on exams or plagiarizing on any assignments will be reported to the WPI Dean of Students in accordance with the Academic Honesty Policy (http://www.wpi.edu/Pubs/Policies/Judicial/sect5.html). Cell phones, tablets, laptops, or any other mobile electronic device may not be in sight during an exam. Please put them away.