Genetics

Course: Biology 213-B, Fall 2019
Instructor: Oscar Sosa, Ph.D.
Office: Thompson Hall 257C
Office hours: Mon, Tue, and Fri 3:00-4:00 PM or by appointment.
E-mail: ososa@pugetsound.edu
Phone: (253) 879-2748
Class schedule: Thompson Hall 395, Mon-Wed-Fri 11:00 AM -11:50 AM
Laboratory schedule:
Biology 213-BA Thompson Hall 323, Wed 1:30 – 5:20 PM
Biology 213-BB Thompson Hall 323, Thu 1:00 – 4:50 PM
Recommended Text: Introduction to Genetic Analysis, 11th ed., Griffiths et al, 2015 (10th and 9th editions are acceptable).
Laboratory manual: All laboratory reading materials will be posted on Canvas.
Course website: All materials and assignments will be available online through Canvas: https://pugetsound.instructure.com/courses/2855

Introduction
Genetics is a science of information. We currently live in the postgenomic era where access to large quantities of genetic information has accelerated our ability to study complex biological problems and to modify the DNA of living organisms, including ourselves. Breakthroughs in our understanding of genetics have profoundly transformed our society, from how we treat disease to how we grow crops, not to mention the economic and ethical implications these practices have brought. Genetic advances will most likely continue to transform humanity and society. This course is intended to provide you with a foundation in the core principles of genetics. Obtaining this foundation will allow you to explore in further detail different areas of genetics and biology and hopefully will also help you navigate the present day ethical challenges associated with genetics research. As part of the course you will have the opportunity to discuss peer-reviewed research articles and write about topics in genetics that are of general interest to the public today.

Course Overview
The course is divided into three main sections. We will start the course learning about (1) Molecular Genetics which helps us understand how genetic information is transmitted and read to drive biological processes. We will then move into the study of (2) Transmission Genetics, how genetic information is passed from one individual to another. We will complete the course with an overview of (3) Evolutionary Genetics which provides insight into the mechanisms that give rise to the observable diversity in populations and how these adapt to their environment.

Course Objectives
The primary objective of this course is for you to develop an understanding of the core concepts of genetics. Using those core concepts, you should be able to achieve the following learning outcomes:
Think logically and critically as you apply genetics concepts to analyze and solve problems
Critically analyze, present, and discuss scientific material
Collect, interpret, and present scientific genetic data gained through experimentation
Communicate your ideas effectively through writing and presentation
Relate genetics concepts to your own experience as an individual and as a member of society

Canvas
We will use the Canvas learning management system for this class. The Canvas site for Genetics BIOL 213B will contain essential material for the course such as readings, problem sets, laboratory protocols, schedule updates, and announcements. I will post the images/slides I use during class after the given class session. You will also use Canvas to submit your writing assignments.

Class Sessions
Topics will follow the class schedule. The topic schedule is likely to change throughout the semester; I will post revised schedules on Canvas and announce revisions in class. Your time in class will be most productive if you:
1. Prepare for class in advance by reading the indicated textbook chapters and posted reading materials.
2. Come to class on time.
3. Engage in thoughtful, effective note taking during class.
4. Contribute to class discussions and exercises and ask questions.
5. Following each class, assess your learning by working through problems sets.

Class Correspondence
You may contact me by telephone and e-mail. Feel free to also setup an appointment this way. **I will use e-mail and/or Canvas to provide information about the class and/or lab.** You are also welcome to stop by my office (Thompson Hall 257C) at any time.

Laboratory
In this portion of the course you will be engaged in inquiry-based, hands-on laboratory practices where you will apply some of the concepts covered in class and learn some of the techniques used in genetic research. The laboratory schedule and laboratory protocols will be available on Canvas. Please read the lab materials and prepare for lab well in advance. Some lab activities may require you to prepare components of the lab one or two days prior to your scheduled lab time. Bring the protocol(s) to lab—you may bring a laptop, electronic device, or a paper copy of the lab protocols; or you may write the protocol in your lab notebook (see below).

Please purchase a **lab notebook** prior to the first lab session. We will be conducting multi-week research experiments throughout the semester. A thorough lab notebook will assist you with your experiments and reports. Your lab notebook will be evaluated several times during the semester.
We will use the model organism, *Arabidopsis thaliana* (a flowering plant), for our experiments. Using live organisms introduces variability; so be aware that the lab protocols and lab schedule may vary throughout the semester.

You will write one laboratory report on your *A. thaliana* experiment. The report format will be provided in lab. The lab report will be due Wednesday, December 11, 2019. The due date is also noted on the lab and class schedules.

**Laboratory Safety**

Maintaining a safe working and learning environment in the laboratory is a priority for this class; therefore, whenever you are in the laboratory or prep rooms you must:

- Wear closed-toed shoes.
- Make sure your legs and arms are covered.
- Wear lab safety goggles.
- Tie back long hair.
- Never eat or drink (or apply cosmetics) in the lab. There are shelves available outside the lab; you are welcome to leave food and drink on the shelves whenever you are in the lab (just wash your hands well before consuming food or drink after being in the lab or prep rooms).

**Laboratory Recitation**

The first part of each laboratory period will be typically dedicated to a recitation. Recitation is a time for us to meet as a small group. We will use this time to discuss topics covered in class/lab, work on practice problems, and/or discuss scientific papers, clarify questions regarding lab protocols, among other activities.

**Problem Sets**

Your text provides problem sets at the end of each chapter to help you assess your understanding of the material covered in that chapter. These problems are a great aid to test your learning. I encourage you to use them to practice. We will dedicate several class days, as indicated on the class schedule, and time during lab recitation to work on some of these problems. Problem sets assigned during lab recitation will be collected the following week and graded on completion. All other problem sets we review in class are tools for you and will not be collected or graded. We will also work on problems and case studies during class periodically throughout the semester.

**Rapid In-Class Presentations**

The goal of this exercise is for you to identify a type of local industry, research program, or economic activity that is applying genetics today and connect their genetic application to the concepts we will cover in the course. Later in the course, you will prepare a brief presentation (3 minutes) to share your findings with the class. We will devote a brief period during lab recitation or lecture to allow one or two students to present. As part of the assignment you will submit a summary of your research through Canvas. A detailed description of this assignment will be posted on Canvas.
Writing Assignments
You will be given several opportunities to write about genetics during the semester. Science liaison librarian Eli Gandour-Rood has developed a webpage to assist you with research and writing: https://research.pugetsound.edu/biol213. The link to this page is also posted on Canvas. We will have three types of writing assignments in this course:

(1) **Genetics in the Media (x2):** Two Genetics in the Media assignments are listed on the class schedule. These assignments require you to find media coverage (e.g., news articles, mainstream science magazines) that discusses a topic or application in Genetics. One the main goals is to draw connections between the genetic application the article is describing and the topics we will cover in class. This assignment will also give you an opportunity to exercise critical thinking. A detailed description of this assignment will be posted on Canvas.

(2) **Journal article writing assignment (x1):** This assignment is posted on the class schedule. The assignment consists of reading several peer-reviewed journal research articles that match a topic we have covered in lecture. The journal articles will be posted on Canvas. One of the main goals is for you to critically evaluate the genetics research described in the study. We will have an in-class discussion to share our thoughts and analyses of these papers. There will be additional times during the semester when we will read and discuss journal articles relevant to the topics covered in class but there will only be one graded written assignment of this type.

(3) **Laboratory Report:** The laboratory report assignment is briefly described above, and details will be provided in the laboratory section and on Canvas.

Quizzes and Exams
There will be four short quizzes given on the dates indicated on the class schedule. The quizzes will be given during the first 15 minutes of class on the days indicated. No make-up quizzes will be given; however, the lowest quiz score will not be included in the overall quiz grade.

Three exams will be given on the dates indicated on the class schedule. Exams will include material covered through the date indicated on the schedule. Exams will be given during the scheduled class period. No make-up exams will be given.

According to university policy, the final exam will be given only at the time indicated by the university final exam schedule. The final exam for this class is scheduled for: **Wednesday, December 18, from 12:00 – 2:00 PM in Thompson Hall 395.** The final exam is comprehensive and will be worth the same value as the mid-term exams. We will also have a Review Session before the final exam, on Monday, December 16, from 10:00 AM – 12:00 PM in Thompson Hall 395. Attendance at the review session is optional. You can also find the Review Session information on the class schedule.

All quizzes and exams must be taken on the scheduled day; no make-up quizzes or exams will be given.
Assessment of Learning

Summary of Grade Components

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage of Grade</th>
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<tbody>
<tr>
<td>Rapid Presentation</td>
<td>5</td>
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<tr>
<td>Genetics in the Media assignments</td>
<td>5</td>
</tr>
<tr>
<td>Journal Articles assignment</td>
<td>5</td>
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<tr>
<td>Laboratory (including lab report and problems sets)</td>
<td>25</td>
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<tr>
<td>Quizzes</td>
<td>15</td>
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<tr>
<td>Exams</td>
<td>45</td>
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Grading Scale

- A ≥ 92.6%
- A- = 89.5-92.5%
- B+ = 87-89.4%
- B = 82.5-86.9%
- B- = 79.5-82.4%
- C+ = 77-79.4%
- C = 72.5-76.9%
- C- = 69.5-72.4%
- D+ = 67-69.4%
- D = 62.5-66.9%
- D- = 60-62.4%
- E < 60%

Grading Policies

- No make-up quizzes or exams will be given. In cases of medical or family emergencies, I will discuss options with you. Documentation will be required in these cases.
- Late lab questions or assignments will have 25% deducted per day late. Labs or assignments will not be accepted after two days.
- No extra credit will be given.
- Grading is subject to change at discretion of the instructor at any time. Any changes on grading will be clearly communicated in class.

Special Note on Discussing Graded Exams

I will not discuss an exam or exam grade within 24 hours of returning the graded exam to you. If you wish to dispute the grade or further discuss how to improve your study habits I will be happy to meet with you after the 24-hour time period.

If you wish to dispute a test grade you must return the test directly to me with a typed appeal attached to the front of your test. This appeal should indicate (1) which question(s) you would like re-graded and (2) why you are disputing the grade you received. I will also check each exam to ensure that the point total was correctly calculated. I will accept appeals up to one week from the date that the test was returned to you.

Academic Integrity
The university’s academic integrity policy is clear and comprehensive. It is available on page 237 of the 2019-2020 Academic Handbook
https://www.pugetsound.edu/files/resources/ad20bulletinug_web.pdf

You are responsible for understanding what constitutes plagiarism and other forms of academic dishonesty. Academic integrity is vital to your work as a student, including in this course. **All assignments must be written individually unless otherwise noted.** **Cheating, plagiarism, and other forms of academic dishonesty will NOT be tolerated.** Contact me with any questions regarding academic integrity. **Academic dishonesty will result, at a minimum, in no grade for the given assignment and submission of an Academic Integrity Incident Report.** I may take additional measures in response to instances of academic dishonesty.

**Behavior Expectations**
You are expected to behave in an appropriate manner. Use your common sense; here are a few guidelines:

- Welcome, accept, and respect diversity. Understand that everyone is unique, recognize our individual differences, and support and protect diversity along any dimension.
- Be punctual—be on time for both class and lab.
- **Personal technology;** please be respectful of others in class:
  - Switch your phone off before coming to class.
  - You may use a laptop, tablet, etc. in class if it is not a distraction to others.
  - You may not use any electronic device during quizzes and exams unless approved by me.
- You may not make audio recordings of our class or lab sessions without prior consent from me.
- If you leave the room during an exam, your paper will be collected, and you will not be permitted to return to the exam.
- You may bring food and/or drinks to class if the consumption of food and/or drinks is not a distraction to others.

**Bereavement Policy**
Upon approval from the Dean of Students’ Office, students who experience a death in the family, including parent, grandparent, sibling, or persons living in the same household, are allowed three consecutive weekdays of excused absences, as negotiated with the Dean of Students. For more information, please see the policy and procedure statement on the Dean of Students website: https://www.pugetsound.edu/student-life/dean-of-students-office/ and on page 240 of the 2019-2020 Academic Handbook https://www.pugetsound.edu/files/resources/ad20bulletinug_web.pdf

**Classroom Emergency Response Guidance**
Please review university emergency preparedness, response procedures and a training video posted at www.pugetsound.edu/emergency/. There is a link on the university home page. Familiarize yourself with hall exit doors and the designated gathering area for your class and laboratory buildings.
If building evacuation becomes necessary (e.g. earthquake), meet your instructor at the designated gathering area so she/he can account for your presence. Then wait for further instructions. Do not return to the building or classroom until advised by a university emergency response representative.

If confronted by an act of violence, be prepared to make quick decisions to protect your safety. Flee the area by running away from the source of danger if you can safely do so. If this is not possible, shelter in place by securing classroom or lab doors and windows, closing blinds, and turning off room lights. Lie on the floor out of sight and away from windows and doors. Place cell phones or pagers on vibrate so that you can receive messages quietly. Wait for further instructions.

Office of Accessibility and Accommodations
If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Peggy Perno, Director of the Office of Accessibility and Accommodations, 105 Howarth, 253.879.3395. She will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential. I fully support documented accommodations that are brought to my attention well before their implementation.

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