**Genetics**  
Biology 213A, Spring 2019

**Instructor:** David Sultemeier, Ph.D.  
**Office:** Thompson 223D  
**Office Time:** T 12:00-1:00 pm, Th 11:00-12:00 pm, or by appointment  
**Email:** dsultemeier@pugetsound.edu

**LECTURE:**  
TH 395 MWF, 11:00-11:50 am

**LABORATORIES:**  
TH 323 213AA, M 1:00-4:50 pm; 213AB, T 1:00-4:50 pm  
(Bryan Thynes, Ph.D.); 213AC, W 1:00-4:50 pm;

**TEXTS:**  
*Introduction to Genetic Analysis*, 11th ed., Griffiths et al., 2015
Notebook with carbon copy pages for the laboratory

**LABORATORY MANUAL:**  
All laboratories will be posted on Canvas.

**COURSE WEBSITE:**  
Course material will be available on the University of Puget Sound Canvas website: [https://pugetsound.instructure.com/](https://pugetsound.instructure.com/)

**INTRODUCTION**

It is the dawn of a new era in genetics. Genes are everywhere and have potential for serious implications in personal and public life. We live in a time when a human genome can be sequenced for less than $1,000; something that cost $1 billion less than 20 years ago. With technological advancements and expanding population data sets, scientists are making discoveries and advancing our understanding of the underlying roles our genes play in shaping who we are as individuals and as members of communities. But what can our A, T, G and Cs really tell us? What is our genetic “potential” and how does the environment affect our potentials? This is an exciting time to be a geneticist, but with advancements in the field comes ethical dilemma, including genetically engineering humans.

Topics covered in the course include:

I. Molecular genetics  
   • Structure and function of genes and chromosomes  
   • How genes affect phenotypes: gene regulatory networks  
   • Epigenetic modifications and inheritance

II. Population genetics  
   • Genetic variation arises by mutation  
   • Genetic variation also arises by chromosome reassortment and homologous recombination  
   • Genome structure, function and evolution: causes and consequences of chromosomal changes  
   • Phenotypic effects of natural genetic differences, heritability
III. Transmission genetics
- Genetic analysis: investigating gene action using inheritance of simple traits (Mendelian traits; heterozygosity, dominance effects) and phenotypes in crosses and pedigrees.
- Linkage and sex linkage
- Organelle genetics: Mitochondrial inheritance
- Genome-wide association studies and related studies linking genes to phenotypes
- Genetics of aging and cancer (alleles affecting risk).

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 213A) will contain essential material for the course such as readings, problem sets, laboratory protocols, schedule updates, and announcements. I will post the images I use during class after the given class session. You will also use Canvas to submit your writing assignments. You may use the Canvas Calendar to make appointments with me outside of class and lab.

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 by skimming the textbook before the class.
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 problems, reviewing material, reading the textbook, etc.
CLASS CORRESPONDENCE

You may contact me by telephone, e-mail, or in person. I check my e-mail periodically throughout the day but usually not often, if at all, in the evenings or on weekends. I usually respond to e-mails within 24 to 48 hours of receiving them. I will use e-mail and/or Canvas to provide information about the class and/or lab. You are welcome to stop by my office (TH223D) at any time.

LABORATORY

Through the laboratory portion of this course you will learn some of the techniques and skills used in genetic research as well as apply concepts covered in class. The laboratory schedule and laboratory protocols are available on Canvas. Please read the lab materials and prepare for lab well in advance. Some lab protocols 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 with carbon copy pages 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 carbon copy pages will be collected and assessed.

We will use three model organisms for our experiments: Arabidopsis thaliana (a flowering plant), Drosophila melanogaster (fruit flies), and Escherichia coli (bacteria). 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 and two short reports, one on the Drosophila experiments and one on the E. coli experiments. Report formats will be provided in lab and the due dates for these reports are 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).
**Recitation**

The first part of each lab period will be 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, 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. I will suggest problems for each chapter. I strongly recommend that you complete at least the recommended problems. We may work on some of these problems during recitation. Problems from recitation will be collected the following week and “graded” on completion. All other recommended problem sets 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.

**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; the link to the page is posted on Canvas. We will have three types of writing assignments in this course:

1. **In-class writing assignments (x4):** You will be required to write short, in-class opinion pieces. These assignments will each be worth 10 points and will be “graded” on whether they are completed and turned in. No late assignments will be accepted.

2. **Laboratory Reports:** The laboratory report assignments are briefly described above, and details will be provided in the laboratory section on Canvas. The full lab report will be worth 50 pts and the two short reports will be 20 pts (Drosophila) and 10 (E. coli).

3. **Genetics this Month (x2):** Two Genetics this Month papers are listed on the class schedule. These assignments require you to briefly review a primary journal article and provide an opinion. The papers will be worth 25 points each. A description of this assignment is provided on Canvas.

**Quizzes and Exams**

There will be five short quizzes given on the dates indicated on the class schedule. The quizzes will be given during the last 10 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. Each of the exams will be worth 100 pts and 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, May 15, from 12:00 – 2:00 PM.**
The final exam is comprehensive and will be worth the same value as the mid-term exams (100 pts).

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

**ASSESSMENT OF LEARNING**

*Total Points Possible – 830 pts* (400 pts exams, 100 pts quizzes, 40 pts in-class assignments, 50 pts Genetics this Month, 240 pts laboratory)

**Grading Scale**

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<tr>
<th>Grade</th>
<th>Minimum Percentage</th>
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<tr>
<td>A</td>
<td>92.6%</td>
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<tr>
<td>A-</td>
<td>89.5-92.5%</td>
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<tr>
<td>B+</td>
<td>87-89.4%</td>
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<tr>
<td>B</td>
<td>82.5-86.9%</td>
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<tr>
<td>B-</td>
<td>79.5-82.4%</td>
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<tr>
<td>C+</td>
<td>77-79.4%</td>
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<tr>
<td>C</td>
<td>72.5-76.9%</td>
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<tr>
<td>C-</td>
<td>69.5-72.4%</td>
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<tr>
<td>D+</td>
<td>67-69.4%</td>
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<tr>
<td>D</td>
<td>62.5-66.9%</td>
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<td>D-</td>
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**Grading Policies**

- No make-up exams (except in cases of medical or family emergencies, documentation will be required to make up the exam).
- 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.

**Special Note on Discussing 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 pages 4 – 6 of the [Academic Handbook](https://www.pugetsound.edu/student-life/personal-safety/student-handbook/academic-handbook/). 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**

I expect you 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/](https://www.pugetsound.edu/student-life/dean-of-students-office/).*

**Emergency Response Guidance**

Please review university emergency preparedness, response procedures and a training video posted at [www.pugetsound.edu/emergency/](http://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 fleeing 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.**

**COPYRIGHT AND FAIR USE**

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**GRADING (subject to change at discretion of instructor at any time)**