

Syllabus BIO 303 – Genetics, Fall 2020



Class Meeting Time:

Monday: 11:40 am - 12:30 pm (Online)

Wednesday: 10:40 am – 12:30 pm (Online)

Lab:

Section A - Thursday: 9:40 am – 12:30 pm (Online)

Section B - Thursday: 1:40 pm – 4:30 pm (Online)



Instructor: Christopher Mayack

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Office hours: **Monday and Wednesdays 12:30 – 1:30 pm or by appointment** (E-mail me to schedule an appointment).

Office hours for TAs will be determined and announced.

Overview

The goal of this course is to provide a detailed understanding of the organization, function, and evolution of genes and genomes from a variety of model organisms. Topics include classical genetics and the molecular basis of heredity, chromosome structure and genome organization, genomic variation and gene regulation. In lecture and the laboratory we will investigate both classical and current molecular approaches to genetic analysis. A major component of the course will also explore the unique scientific methods geneticists use to solve problems. Finally, over the course of the semester, we will consider the ways in which modern genetic technology affects society and our understanding of disease.

Readings/Text

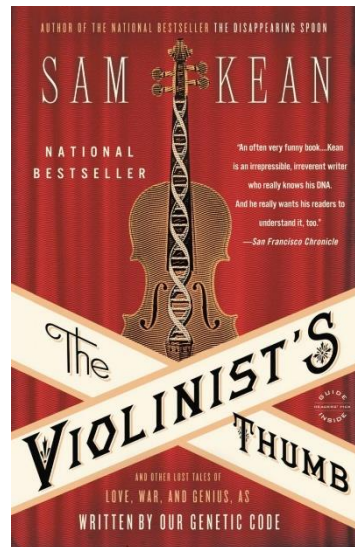
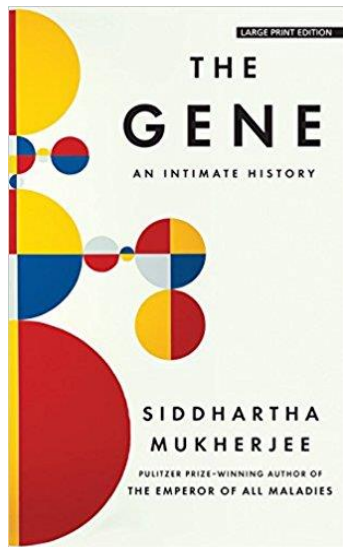
The required text for this course is Essential Genetics: a Genomics Perspective (6th Edition, Jones & Bartlett) by Daniel Hartl. Readings from the text are listed in the Course Schedule next to the lecture for which they apply and will be listed on SUcourse. Additional readings (journal articles) will be assigned over the semester for discussions. These will be made available on SUcourse.

Supplemental and updated readings will be posted on SUcourse and announced prior to the relevant lecture. Due to the current, up-to-date nature of the course, readings and topics are subject to change, but, in general, the topic schedule serves as a good approximation of what you can expect.

The Gene by Siddhartha Mukherjee is an excellent history of Genetics that was just published in 2016 and provides some additional historical context to the study of Genetics. While readings in *The Gene* are not required, I encourage you to give this a read if you find what we are learning in class interesting.

The second optional reading if you are into genetics is *The Violinist's Thumb* by a New York Times bestselling author Sam Kean. This is a popular read so it is light and intriguing and he covers an amazing range of interesting topics that all of which can

be linked back to studying DNA and genes. I have read some of this book and have found it a really interesting and provocative book!



Evaluation

As this is a lecture/discussion/lab integrated course, your grade will be composed to reflect this integrative nature. We will have three exams (non-cumulative), problem sets, written lab assignments and a group presentation related to the lab portion of the course.

Your final grade breakdown will consist of the following:

Exam I – 100 pts

Exam II – 100 pts

Exam III (Final) – 100 pts

Problem Sets – 10 pts each (5 total, 50 pts)

Discussion Reflection Questions for journal articles – 10 pts each (4 total, 40 pts)

Debate assignment – 20 pts

Tophat participation – 10 pts

Tophat correct answer score – 20 pts

Total points from Lecture: 440 pts

Lab notebook (10 pts per week, 10 weeks total) – 100 pts

Population Genetics Lab Experimental Design – 30 pts

Population Genetics Lab report final draft – 50 pts

Independent project oral presentation – 50 pts

Total points from Lab: 230 pts

Grand total for class: 670 pts

Laboratory Policy

NOTE: If you miss 3 or more lab activities without a valid excuse you will fail the course. This semester labs will be demonstrated by the TAs and video recorded, then they will be placed on SUcourse+ for weekly viewing. In terms of You will be guided in the writing of the Population Genetics Mating lab activity for both the experimental design and the final draft. During the last week of lab, you will present results from your independent DNA barcoding activity. You are also required to keep a detailed digital lab notebook (10 pts per week) that will be checked and graded weekly by the TAs.

Reflection questions

To prepare for our journal article discussion sessions (mainly in the second half of the semester), I will distribute reflection questions to guide your reading and thoughtful preparation for in-class discussion of primary literature articles. **I will ask that you provide brief answers to those questions by 8 am on the day of our discussions on the SUcourse+ site.** You will have the opportunity to revise your answers in light of our discussions. Your answers and your revisions will constitute a portfolio, which will account for 40 pts of your final grade for the semester. A “Guide to reading primary literature” has been included on SUcourse to guide you in best practices for reading primary literature.

Course Policies

Academic Integrity Policy -- **YOU MUST READ AND FOLLOW**

Each student will be evaluated only for her/his own work. Students are encouraged to work and study together; however, what you put down on your problem sets, lab reports, and exam papers should be your own work in your own words. Be aware that you will not be helping your friends by allowing them to copy. Do not allow your friends to make use of your problem sets or, lab reports and exams, allowing them to copy will not help them in the long run. Such behavior, as all forms of cheating, is unfair and disrespectful to yourself, to all the students in the class, to your instructors and teaching assistants, and to the University. A student involved in cheating has misused the trust extended to him or her. If discovered, **such behavior will have DISCIPLINARY consequences for all parties involved.**

Violations of academic integrity will result in zero grades for that worksheet or exam, both for those who cheat and those who allow and help them cheat. In all such situations we will ask you to have a face-to-face meeting with the instructor. We have mutual trust and respect for each other as individuals while sharing a collaborative learning experience. This is very valuable for all of us, and having to lose this trust and respect would be very regrettable.

Problem Sets: These will be handed out and due in class as announced and listed on SUcourse (5 total). Collaboration on problem sets is strongly encouraged during class and some class time will be set aside to begin working on specific problems and ways to tackle them.

However, you must write up your problem set solutions independently. You must credit all sources of information, including students, tutors, books, websites, instructors, etc. If you work with others to derive your answers, please list those students/sources on the front of the problem set prior to handing it in. Problem sets are an excellent way to prepare for exams and to ensure you fully understand and can utilize the material we will be covering. The problems are challenging! Make sure you set aside time to work on these and come to office hours for help as needed.

Laboratory Reports: You are encouraged to discuss laboratory data and lab assignments with other individuals (e.g. students, instructors, TAs, etc.). However, you must compose each laboratory report individually.

Copying any portion of another individual's report or lab notebook is a violation of academic integrity and will be dealt with as outlined above. You must credit all sources of information, including students, books, websites, journal articles, etc. The college's policy on plagiarism applies to all writing assignments in this course. All writing assignments are checked for plagiarism using turnitin.com, an online plagiarism detection service, through SUcourse. All papers must be in the formal format described in "How to write a paper in scientific journal style & format" on the Bates College Writing in Biology website:

<http://abacus.bates.edu/~ganderso/biology/resources/writing/HTWtoc.html>

Late work policy: Due dates for all written assignments, including problem sets and lab write-ups, are strict. Extensions will be granted only for cases of true hardship and only when arranged prior to the due date. **Late work will be penalized by a 10% grade reduction per day and will not be accepted if it is more than 2 days late.** Only notes from the Health Center and/or signed note from a medical doctor or President of the University may count as an excuse for late work.

Class Participation: Participation will be based on the quality of your comments during discussions and the questions you ask during lecture. To get a C in participation you should be asking a question or speaking once every few weeks. Of course, asking questions every class does not insure a high participation grade, rather, an A is earned by asking thoughtful questions about material that may be confusing and making comments that move paper discussions forward. You can ask me to evaluate your participation and give you feedback at any point in the semester.

***NOTE* If there is a problem with a group member with work participation please notify me as early as possible.**

Grading: If the first decimal place is 5 and larger, then the number will be rounded up to the next integer (e.g., 67.5 → 68). Failing to take **one** of the exams will result in failing the course. The letter grade ranges are provided in the table below.

Letter Grade	Criteria for Earning Grade
A	100 – 93 %
A -	90 – 92 %
B +	89 – 86 %
B	85 – 83 %

B -	82 – 80 %
C +	79 – 77 %
C	76 - 73 %
C -	72 – 70 %
D +	69 - 67 %
D	66 – 63 %
D -	62 – 60 %
F	Less than 60 %

Exams: Exams are closed-book and will be taken online during class time (no longer than 50 minutes), and no outside sources of information are allowed, unless provided by the instructor. In the event that you take an exam at a time that differs from other students, no communication of any kind regarding the exam is permitted. Although all tests (including final) will be non-cumulative in details, you are expected to have a broader understanding of genetics by the end of the semester. Make-up exams will be given only in extreme circumstances. Only notes from the Health Center and/or signed note from a medical doctor or President of the University may count as an excuse for missing an exam. Make-up exams will tend to be more difficult to discourage the behavior of missing the original exam time.

Disability Accommodations: If you need disability-related accommodations (extra time, etc.) for this course, please contact Ş.Ceren Başak Araz at the Disable Students Support Unit Center of Individual and Academic Development (CIAD) address: Orhanlı, Tuzla, 34956, Istanbul, Turkey
e-mail: specialneeds@sabanciuniv.edu
telephone: + 90 216 483 9448
website: <http://ciad.sabanciuniv.edu/en/disabled-students-services>
Accommodations with an approved letter will be arranged on a case by case basis.

E-MAIL: Check for messages on SUcourse+ about the course frequently. E-mail is also the best way to make an appointment with the instructor. I will send e-mails to your Sabancı e-mail, be sure to check it.

COVID19: We are facing uncertain times, but all online lectures and labs will be synchronous and recorded. These videos will be uploaded to SUcourse+ along with the powerpoint presentations to try and make this course as accommodating as possible for your education. Office hours chats will be held with google meet so that I am available if you need any help. All scheduling especially lab scheduling is subject to change due to uncertainties caused by the COIVD19 pandemic.

Other important points:

- If you are involved in off-campus activities (e.g. dance, theater, sports, music) that asks you to leave town, please provide me with a list of your scheduled games or events at the START of the semester, as well as the phone number of the coach/supervisor, and I will make a reasonable effort to accommodate your needs.

- Back-up your work!! Save often and save multiple versions! Good scientists have many copies of their data and writing, one of which is a "hard copy"; a version you can hold in your hand (e.g. paper). Another good habit is to e-mail yourself a copy of

your work. Papers, etc handed in late due to computer failure are assessed the same penalty as those turned in late for other reasons. I also recommend downloading google drive. This is a free service that automatically backs up your smaller documents to the cloud as you save them.

Finally, please don't hesitate to contact me for clarification on any course policy-related questions.

Important Course Dates:

Exam I (online during class time) – November 11th

Exam II (online during class time) – December 9th

Exam III (Finals Week online) – TBD

Lab Report – Experimental project proposal is due December 2nd, the final project write up is due January 21st

Independent Project Oral Presentations (online during lab time) – December 12th & December 31st

Debate January 4th during class time

Student Learning Objectives:

By the end of this course you should be able to:

1. Describe how genetic information is used, stored, and replicated, and how it informs phenotypes
2. Compare and contrast methods used to study genetics, from the level of inheritance patterns, through molecular analysis of single genes, to entire genomes and the genetic analyses of populations
3. Test how genetics drives evolutionary change and gene/environment relationships
4. Interpret the results of genetic experiments and several pieces of concepts to demonstrate how the mechanisms of genetics operate
5. Construct new information you have about genetics in a novel context
6. Relate the components of a genetic analysis to each other
7. Develop a novel molecular phylogenetic tree integrating new genetic information with pre-existing genetic information from GenBank (i.e. create something new by using/combining disparate sources of information)

“Education is not the filling of a pail. Education is the lighting of a fire.”

- W.B. Yeats