

## Syllabus BIO 303 – Genetics, Fall 2024

### Class Meeting Time:

Wed: 02:40 pm -04:30 pm FENS G015

Thurs: 03:40 am -04:30 pm FENS G015

### LAB

One section: Thursday: 12:40-03:30 pm  
**FENS G049/50**

### Instructor:

Zaeema Khan

Office: FENS G016

Office phone: 0-216-568-9530

E-mail: [zaeema.khan@sabanciuniv.edu](mailto:zaeema.khan@sabanciuniv.edu)

Office hours:

**(by appointment e-mail me to schedule as I also work in FENS 2053 Lab).**

**Wednesday** 10:30-12:30 pm

**Thursday** 09:30-11:30 am,

**Teaching Assistants:** Ezgi Güllü, Zeynep Sude Aksu

Zeynep Sude Aksu

[zeynepsude@sabanciuniv.edu](mailto:zeynepsude@sabanciuniv.edu)

Ezgi Güllü

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**Office hours for TAs will be determined and announced.**

**Learning Assistants:-** Leen Ahmed, Ahmet Bera Efe

### 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.

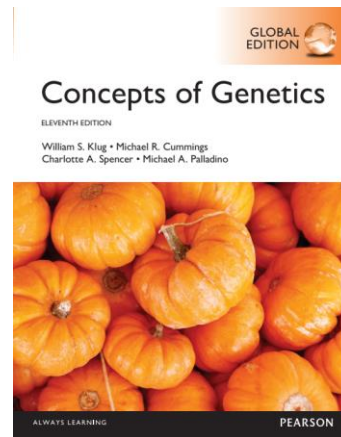
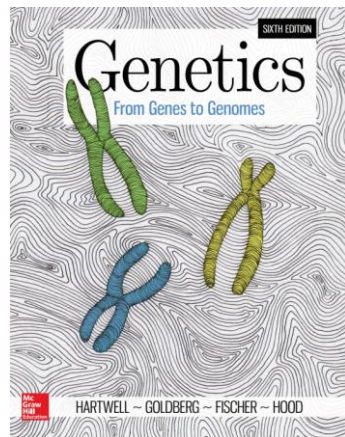
### Readings/Text

The required text for this course is Essential Genetics: a Genomics Perspective (6<sup>th</sup> Edition & 7<sup>th</sup> 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



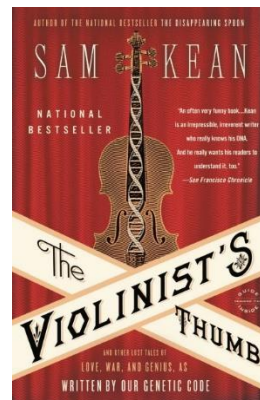
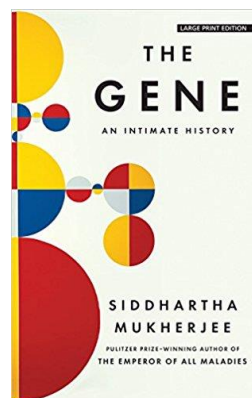
SUCourse. Additional readings (journal articles) will be assigned over the semester for discussions. These will be made available on SUCourse.

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.



Concepts of Genetics by Klug & Cummings, 11<sup>th</sup> Edition is a comprehensive embellished book which the students can read for further explanation and details of their topics. Though not the main course book this is entirely optional, various concepts are expanded in this book with additional information and can prove useful to the students to grasp the topics covered. This book is an excellent source for classical genetics.

The second optional reading as a guide book for molecular genetics is Genetics: From Genes to Genomes by Hartwell & Goldberg. This book focuses primarily on techniques discovered and utilized till today in molecular biology lab work. It provides an in-depth detail on microbial genetics which is the main tool used for genetic laboratory studies and manipulation. For students wishing to pursue molecular biology this book provides an excellent foundation.



To understand how the lives of the various geneticists unfolded and their own journey into unravelling their iconic discoveries there are two optional books: *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 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 two 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:

Midterm Exam – 100 pts

Final Exam – 150 pts

Debate assignment – 20 pts

**Total points from Lecture: 270 pts**

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

Population Genetics Lab report final draft – 50 pts

Independent project oral presentation – 50 pts

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

**Total points from Lab: 300 pts**

**Grand total for class: 570 pts**

### **Laboratory Policy**

**Participating in lab is mandatory, and preparation and attendance for every lab period is required.**

**NOTE: If you miss 3 or more lab activities without a valid excuse you will fail the course.**

You will be guided in the writing of the Population Genetics Mating lab activity for both the first and 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 lab notebook (10 pts per week) that will be checked and signed for credit before you leave the end of the lab period.

### **Reading Literature for Debate & Presentation Preparation**

To prepare for your project presentation and debate sessions (mainly in the second half of the semester), I will distribute reflection questions to guide your reading and thoughtful preparation for in-class debate. 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 class you must come prepared from the previous lecture given. This way you can easily participate in class quizzes and grasp the concepts.**

**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.

**Classwork/Homework Activity:** 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. The **optional** 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 if you would like the extra practice.

**Laboratory Reports:** You are encouraged to discuss laboratory data and lab assignments with other individuals (e.g. students, LAs, instructor, 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](https://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:

<https://www.bates.edu/biology/files/2010/06/How-to-Write-Guide-v10-2014.pdf>

**Late work policy:** Due dates for all written assignments, paper discussion forms and lab write-ups, etc. 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. Participation will also be calculated from your top hat participation scores. Of course, asking questions every class does not ensure 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.

**Attendance:**

Maximum of medical reports allowed is 3.

If you have 3 medical reports and 3 absents in the lab, you will be dropped from the course.

You are allowed a total of 6 absents in your class. If you have 3 medical reports and 3 absents in the class, you will be dropped from the course.

**\*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 in person during class time, 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 the Disable Students Support Unit Center of Individual and Academic Development (CIAD)  
address: Orhanlı, Tuzla, 34956, Istanbul, Turkey  
e-mail: [specialneeds@sabanciuniv.edu](mailto: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.

**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. Use google drive so that it 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:**

**Midterm Exam** (during class time in person) – November 6<sup>th</sup>

**Final Exam** (Finals Week in person) – In between 2<sup>nd</sup> -12<sup>th</sup> January.

**Lab Report** – The final project write up is due January 4<sup>th</sup>

**Independent Project Oral Presentations** (during lab time online) – December 12<sup>th</sup>

**Debate January 25<sup>th</sup>** December 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*