Genetics Concepts Gr.1
Thursday 9:30-12:00 @ KMB215
Instructor: Assist.Prof.Dr. Alper Yilmaz
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Office Hours: by appointment
http://avesis.yildiz.edu.tr/alyilmaz/

Course Goals

In this course, you will learn:

1. Molecular explanations for the terms *dominant* and *recessive*.
2. Phenotype is combination of genotype and environmental effects. Genotype can be single gene or be composed of interactions between multiple genes.
3. Extensions to Mendelian genetics, two gene interactions and cytoplasmic inheritance.
4. Mechanisms governing gene or chromosome mutations.

Course Materials

Most of lecture notes are taken from the following textbook: **Genetics : A Conceptual Approach** *(Benjamin A. Pierce, 4. Edition, 2012)*. In addition, occasionally we'll be referring to **Genetic Analysis & Principles** *(R.J. Brooker, 3. Edition, 2007)* as supplementary source.

Lecture notes are handed in copy center across our department. PDF versions of lecture slides can be downloaded from AVESIS page.

Lecture notes contain mostly pics with sparse text, thus you need to listen the instructor and take notes.

In addition to lecture notes, we will be using an online service which simulates *Drosophila* crossings in an interactive manner: Classical Genetics Simulator

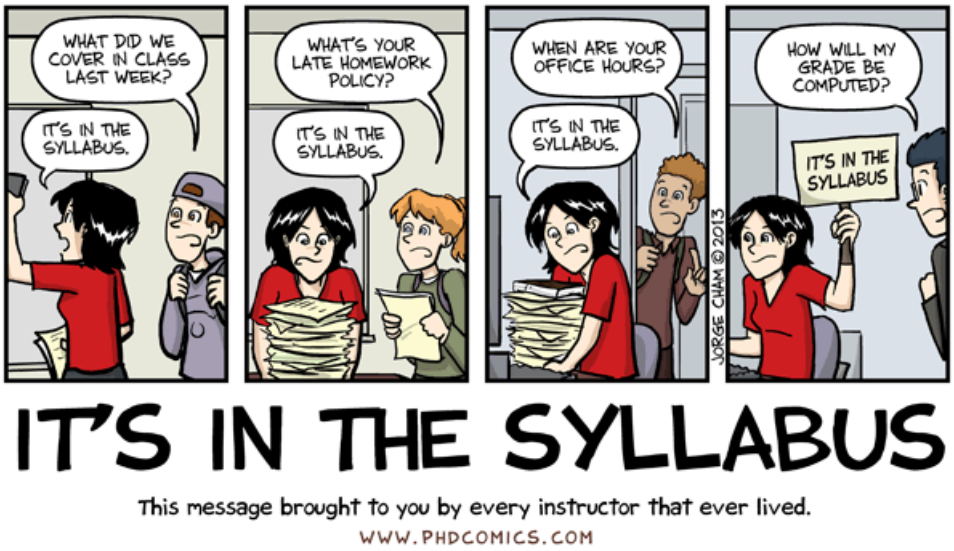

Figure 1: Please read the syllabus

Grading

Your grade will come from the following sources:

- Midterm: 35%
- Final: 40%
- Quiz: 10%
- Assignment: 10%
- Attendance: 5%

Final exam is from the topics covered after midterm exam.

There will be 3 quizzes and highest 2 scores will be considered. If you attend all lectures or miss only one lecture then you'll get 5 points for attendance. For every 1-2 lectures missed you'll lose 1 point.

Assignment will be 2-3 page paper about *Control of eye color in humans* **OR** *How antibiotic resistance emerges?*. In addition, you'll be doing small writings summarizing the lecture at the end of the lecture. More details regarding assignments will be provided in near future.

Communication

I'm trying to respond emails as quickly as possible. If you don't get a response within 1-2 days please don't hesitate to send a reminder email.

The changes pertaining to exam date, time and assignment due dates should be decided in class after discussing with everybody. Please don't ask for changes individually, otherwise notification of whole class becomes a hassle.

Schedule

Below is the tentative schedule for the course. Depending on the speed we go through topics there might be shifts in the schedule. **NOTE :** The midterm date is just a forecast, so **the midterm will take place on the date and time the department announces**.

September 27. **Introduction**

General information about the lecture such as grading policy, course materials, etc. is provided. Then we briefly look at the connection between gene and trait. Also, we'll be told how gene alleles emerge and finally we'll be introduced the concept of *reverse genetics* and *forward genetics*.

October 4. **Genotype and Phenotype**

October 11. **Chi-square test**

October 18. **Extensions of Mendelian Inheritance**

Chapter 4 in our textbook

October 25. **Extensions of Mendelian Inheritance (cont'd)**

Chapter 4 in our textbook

November 1. **Mendelian Inheritance Patterns Involving Two Genes**

Chapter 5 in our textbook and *Chapter 4* in our supplementary textbook.

November 8. **Cytoplasmic (Extranuclear) Inheritance**

Chapter 5 in our textbook and *Chapter 5* in our supplementary textbook.

(November 15). MIDTERM

***November 22.* Recombination, linkage and genetic mapping**

Chapter 7 in our textbook and *Chapter 6* in our supplementary textbook.

Chromosomal or Gene Mutations

***November 29.* Chromosome Variations**

Chapter 9 in our textbook and *Chapter 8* in our supplementary textbook.

***November 29.* Gene Mutations**

Chapter 18 in our textbook.

***December 6.* Gene Mutations (con't) and DNA repair**

Chapter 18 in our textbook.

***December 13.* Quantitative Genetics**

Chapter 24 in our textbook.

***December 20.* Quantitative Genetics (cont'd)**

Chapter 24 in our textbook.

***December 27.* DNA modifications (without sequence change): Genomic Imprinting and Epigenetics**

Chapter 17 in our textbook and additional materials.

Acknowledgments

This syllabus was adapted from Benjamin Schmidt and Andrew Goldstone.