

BIOL-UA.31 Laboratory in Genetics and Genomes

Instructor:

Joseph Osmundson

Course Description:

The goal of this course is to familiarize students, through direct experimentation, with modern genetic and genomic research concepts and laboratory techniques. This course will cover important genetic concepts that include: molecular biology and sequencing technologies, genetic assortment, molecular evolution and genetic screens, penetrance, allelic variation within a population, and the use and understanding of genetic and genomic data in culture and society.

You will have a chance to work with two genetic model systems and to learn about new cutting edge, “deep sequencing” genomic methods that are becoming common in research.

Co-requisite:

Molecular and Cellular Biology I (BIOL-UA 21)

Molecular and Cell Biology II (BIOL-UA 22)

Genetics (BIOL-UA 30)

Textbook and Required Materials:

N/A

Grading:

2 write-ups	40%
2 Exams	30%
4 Homeworks	10%
Class Participation	10%
Notebook	10%

Topics:

Philosophy and Organization Pipetting Lab I

Isolate Cheek DNA

DNA Quantification NanoDrop

Gel electrophoresis Qubit

GoTaq PCR

PCR clean up

PTC Restriction Digest

Agarose Gel Electrophoresis Set up PCR for sequencing

Agarose Gel Electrophoresis, send DNA for sequencing

PTC prediction, Analysis of allelic frequency

Gene of Interest

Test PCR conditions

Molecular Evolution Hardy-Weinberg Analysis

Genetics, Genomics, and Ancestry I

Intro to DNA Replication Intro to Bar-seq

Working with yeast Choose growth conditions

Launch growth cultures Collect cells

Purify yeast gDNA

Bar-seq PCR 1

Check PCR Bar-seq PCR 2
Quantify and QC libraries
Data Analysis with old data
Data Analysis with OUR data
Genetics, Genomics, Ancestry II