

## **Biology 392, Genome Analysis, Spring 2019**

Biology 392, 2.0 credits  
Wednesdays from 12:30-4:20 PM  
ISC 306 (Genetics Lab)  
Prerequisites: Biology 300 (Cell Biology)

### **Instructor**

Dr. Josie Reinhardt  
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Electronic mail: reinhardt@geneseo.edu  
Office hours: Tuesdays 9:00-10:00 AM, Thursdays 1:30-2:30, Fridays 3:30-4:30 PM, and by appointment

### **Course Description (from the undergraduate bulletin)**

The course examines and utilizes modern experimental strategies to study DNA, RNA, and proteins. Special emphasis is placed on bioinformatics resources for cellular molecules and strategies for their simultaneous analysis. Lectures will be supported by the analysis of primary literature, and computational laboratory experiments. Topics covered will be discussed with respect to modern questions in genomics, molecular genetics, and biochemistry. Restricted to Majors. Prerequisites: BIOL 300. Credits: 2(1-3). Offered every spring

### **End of Course Learning Objectives**

At the conclusion of the course...

- students will understand the theory behind techniques for genomic analysis including PCR, gel electrophoresis, mapping, DMA and RNA sequencing, and Real-time PCR.
- students will be able to design, execute, and interpret experiments dealing with modern questions in genetics and genomics.
- students will be able to analyze genomic sequencing data and genotyping data using existing bioinformatic methods, and understand underlying algorithms.
- students will be able to properly use modern equipment in genetics and genomics.
- students will be able to write a laboratory report describing the methodology and results of genetics and genomics experiments they perform.

### **Textbook**

There is no required textbook for the course. Readings for each day will be posted on Canvas when applicable.

## Supplies

\*A laboratory notebook and a pen or pencil for notetaking is required. Many styles are acceptable, including a 3-ring binder with loose-leaf paper, a technical notebook, or simply a standard notebook and folder combo. **Bring your lab notebook to lab each day.**

\*A laptop running Windows or MAC OS with Microsoft Excel and R is required. **Bring your computer to lab each day.**

\*A calculator with scientific notation is required. **Bring your calculator to lab each day.**

\*A laboratory coat is required for some labs. If you don't have one, I need to know the first day and I will get you one. **Bring your lab coat when "lab coat" is listed under equipment for lab that day.**

\*A fine or ultra-fine point permanent (e.g. sharpie) marker is required for labeling purposes. **Bring your sharpie to lab each day.**

## Grading

Participation\* @ 2 points each day of lab + final: 30 points

2 points: Present on-time and participated in all activities

1 point: Tardy, left early, or failed to participate in some activities

0 points: Absent, or participated in less than half of activities

\*You are still responsible for making up any material you missed!

Thirteen quizzes @ 10 points each (14 are given, drop lowest quiz score): 130 points

Four lab reports @ 30 points each: 120 points

280 points total

The following scale (minimum averages) will be used to calculate final grades based on the percentage of 280 total points obtained. Student point totals or grading scheme may be adjusted to reflect course difficulty or section differences (instructor's discretion).

A: 93+; A-: 90-92.9

B+: 87-89.9; B: 83-86.9; B-: 80-82.9;

C+: 77-79.9; C: 73-76.9; C-: 70-72.9;

D: 60-69.9; E: < 60

## Flow of the Class

Each day (except day 1) a Quiz will be administered at the beginning of class. 20 minutes are set aside to complete the quiz. It is based on material from the previous weeks' activities (labs or analysis performed, papers discussed, lecture) as well as the upcoming lab. You'll also need to do some calculations relevant to the proposed lab work so bring your **calculator**. Your lowest quiz grade will be dropped.

After the quiz, course activities will begin. This will vary from day-to-day and may include lecture, "wet" lab activities, computational analysis of data, and discussion of the primary literature. See **Canvas** on **Fridays** for materials you will need for the following weeks' lab.

Four times during the semester a lab report will be due at the beginning of lab. The first two lab reports are written with your lab partner and are based on the first multi week laboratory. The last two are **graded individually** and based on the next two multi week labs.

### **Students with Disabilities**

SUNY Geneseo will make reasonable accommodations for persons with documented physical, emotional, or cognitive disabilities. Accommodations will be made for medical conditions related to pregnancy or parenting. Students should contact Dean Buggie-Hunt in the Office of Disability Services (tbuggieh@geneseo.edu or 585-245-5112) and myself to discuss needed accommodations as early as possible in the semester.

### **Mental Health Policy**

I take mental health problems exactly as seriously as I would issues with your physical health. Diminished mental health, including significant stress, mood changes, excessive worry, or problems with eating and/or sleeping can interfere with optimal academic performance. If the source of your symptoms is directly related to this class, please speak with me. However, problems with relationships, family worries, loss, or a personal struggle or crisis can also contribute to decreased academic performance. SUNY Geneseo provides mental health services to support the academic success of students. Counseling Services, a part of the Lauderdale Center for Student Health & Counseling, offers free, confidential psychological services to help you manage personal challenges that may threaten your well-being. Call 585-245-5716 to make an appointment and also see this page for [emergency resources](#).

### **Academic Honesty and Plagiarism**

All students are expected to follow the specific rules of academic honesty and plagiarism for SUNY Geneseo. Please refer to the 2017-2018 Undergraduate Bulletin for more details.

<b>Date</b>	<b>Week</b>	<b>Main activity</b>	<b>Labcoat?</b>	<b>Due</b>
23-Jan	Week 1	Lab safety, Pipetting tutorial, Primer design	no	n/a
30-Jan	Week 2	CRISPR I: DNA Isolation from Bacteria	yes	Quiz 1
6-Feb	Week 3	CRISPR II: PCR Analysis of CRISPR loci	no	Quiz 2
13-Feb	Week 4	CRISPR III: Sequence Analysis of CRISPR Loci	no	Quiz 3, Report 1
20-Feb	Week 5	CRISPR IV: Annotation and comparison of CRISPR spacers	no	Quiz 4
27-Feb	Week 6	MAPPING I: PCR of Chromosomal Marker Loci	no	Quiz 5
6-Mar	Week 7	MAPPING II: Fragment Analysis of Chromosomal markers	no	Quiz 6, Report 2
13-Mar	Week 8	MAPPING III: Building a genetic map	no	Quiz 7
20-Mar	SPRING BREAK			
27-Mar	Week 9	RNA-seq I: RNA Isolation from Eukaryotes	yes	Quiz 8
3-Apr	Week 10	RNA-seq II: RNAseq Data Analysis	no	Quiz 9, Report 3
10-Apr	Week 11	RNA-seq III: Experiment and Primer Design	no	Quiz 10
17-Apr	GREAT DAY			
24-Apr	Week 12	RNA-seq IV: cDNA synthesis	yes	Quiz 11
1-May	Week 13	RNA-seq V: Quantitative real-time PCR	no	Quiz 12
8-May	Week 14	RNA-seq VI: qPCR data analysis	no	Quiz 13
14-May	final	Report 3 due / final quiz	no	Quiz 14, Report 4