

BIOL 223: Genetics Laboratory Syllabus Fall 2019

Course description (from student bulletin): Selected experiments designed to demonstrate the principles of genetics and to introduce a range of genetics techniques and model systems. Pre- or co-requisites: one semester of organic chemistry and genetics (BIOL 222).

Instructors:

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Lab Materials:

Students should purchase the lab manual (Green cover/spiral bound, entitled "Biology 223 Genetics Laboratory") from the bookstore. Students will also need to have access to the textbook we use in the Genetics Lecture (Genetics Analysis and Principles by Robert Brooker) as background for several labs. If you do not have it let us know. Students should bring a notebook, calculator, pencil, and sharpie every day, along with their laptop, laboratory coat, and UV safe lab goggles when indicated in the schedule (spare coats and goggles are available!).

Course goals:

- (1) Students will learn about experimental design of genetic studies
- (2) Students will learn to collect, analyze, and interpret data
- (3) Students will learn to communicate scientific results in written and oral form
- (4) Students will gain experience with a variety of laboratory skills and model organisms

Flow of the class:

While conducting experiments by actually handling liquids and working with organisms does comprise a goodly amount of the time that is spent in the lab, we will also be spending time thinking through the rationale for the experiments, analyzing and interpreting our data, as well as explaining science to others. In general the labs in this course do not have an outcome that can be determined or predicted *a priori*. Instead, you will learn how to determine *from the data you generate* what biological model is best supported. This makes sense as we are working together not only to ensure you can master techniques, but also to prepare you for future technical and research work in which this sort of thinking and communication is essential.

Before you leave each day, you will work with your lab group to organize for the following weeks' lab. This is best done by drawing a flow-chart and notating who will be doing what for the next weeks' experimental procedures. You should also figure out with your lab mates the purpose of each step. Doing this is the absolute best way to prepare yourself for the pre-lab quizzes which we will do the start of lab (except for the first week). You will also prepare lab reports culminating in a final presentation and report. If you're confused about experimental

procedures or about the results from previous labs, please come to office hours! We'd love to see you!

| Date (Thurs/Fri) | Topic (lab manual reading due before lab!) | Special Equipment needed | Assignments Due |
|-----------------------------|--|---|---|
| Week 1: 8/29-8/30 | Introduction, Safety, working with Bacteria (Appendix C) | N/A | N/A |
| Week 2: 9/5-9/6 | Transformation of <i>E. coli</i> (exercise #1) | Lab coats, UV goggles | Prequiz 1 |
| Week 3: 9/12-9/13 | PCR amplification (exercise #2, Week 1) | Lab coats | Prequiz 2 Approach (ex. 1) |
| Week 4: 9/19-9/20 | Gel electrophoresis (exercise #2, Week 2) | Lab coats, Goggles, Computers | Prequiz 3 |
| Week 5: 9/26-9/27 | Mendelian Genetics (exercise #3) and Environmental Influence (exercise #4, week 1) | N/A | Prequiz 4 Results (ex. 2) |
| Week 6: 10/3-10/4 | Environmental influence (exercise #4, week 2) and multiple alleles (exercise #5, week 1) | N/A | Prequiz 5 |
| Week 7: 10/10-10/11 | Multiple alleles (exercise #5, week 2) | N/A | Prequiz 6 Intro/Rationale (ex. 3/4) |
| Week 8: 10/17-10/18 | Bacterial Conjugation / mapping (exercise #6) | Lab coats | Prequiz 7 |
| Week 9: 10/24-10/25 | Data analysis (Appendix B, exercises #3 and #6) | Computers | Prequiz 8 Figures & Tables (ex. 6) |
| Week 10: 10/31-11/1 | Induction of beta galactosidase (exercise 7) | N/A, Lab coats | Prequiz 9 |
| Week 11: 11/7-11/8 | Luria-Delbruck Fluctuation test (exercise 8, week 1) | Lab coats | Prequiz 10 Full report, group (ex. 5) |
| Week 12: 11/14-11/15 | Luria-Delbruck Fluctuation test (exercise 8, week 2) | Lab coats | Prequiz 11 |
| Week 13: 11/21-11/22 | Presentations | N/A | Final Presentations on Ex.2, Ex. 3&4, Ex. 5, Ex. 6, or Ex. 7 |
| 11/28-11/29 | THANKSGIVING BREAK | | |
| Week 14: 12/5-12/6 | Population genetics (exercise 9) | Computers | Prequiz 12 |

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|--------------------------|--------------------------|-----|--|
| 12/9 (Last Day of Class) | Final written report due | N/A | Final report, individual (Ex 8) |
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Procedures:

- Be sure you know what protective gear is necessary and to follow general lab safety guidelines
- Make sure to clean lab area with disinfectant (if bacteria were used) before you leave, and to wash your hands before you leave the lab.
- Follow proper waste disposal procedures (bacterial/biohazard and chemical waste separate from other waste).
- Leave your backpacks and coats in the atrium area. Food, drink and phones should be left in your backpacks in the atrium and can be accessed in the hallway during breaks.

Students should check Canvas and their Geneseo email regularly for any course updates.

Evaluation:

Grades will be based on criteria listed in the table below.

| Activity | Weight (percentage) |
|---|----------------------------|
| Prelab quizzes | 30 % |
| Attendance/Participation (0-2 pts per day)* | 20 % |
| Lab reports / presentations | 50 % |

*Participation @ 2 points each day of lab

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

1 point can be deducted for any of the following: Tardy, left early, failed to participate, or cell phone use

0 points: Unexcused absence

NOTE: In the case of excused absence (e.g. illness or family emergency) your participation for the week will be dropped, but you are still responsible for making up any material you missed and preparing for the following week.

Grading Scale

The following scale will be used to calculate final grades. Student point totals or grading scheme maybe adjusted to reflect course difficulty or section differences (instructor's discretion).

| | | | |
|---------------------------|---------------------------|---------------------------|---------------------------|
| A = 100-93% | A ⁻ =92.9-90% | B ⁺ = 89.9-87% | B = 86.9-83% |
| B ⁻ = 82.9-80% | C ⁺ = 79.9-77% | C = 76.9-73% | C ⁻ = 72.9-70% |
| D = 69.9-60% | F = 59-0% | | |

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 Ms. Heather Packer in the Office of Disability Services (disabilityservices@geneseo.edu or [585-245-5112](tel:585-245-5112)) and their faculty to discuss needed accommodations as early as possible in the semester. Exams at the testing center should be scheduled for the same day as the exam is held in class.

Mental Health Policy

We take mental health problems exactly as seriously as we would issues with your physical health. Most people at some time in their lives experience an episode of diminished mental health, just as they do at some point experience periods of injury and diminished physical health. Mental health issues 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 us and we will work together to find a remedy. However, problems with relationships, family worries, loss, or a personal struggle or crisis can also contribute we cannot urge enough how important it is that you know help is available and seek it if you have need. SUNY Geneseo provides mental health services to support the academic success and health 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: <https://www.geneseo.edu/health/emergency-info>)

Academic Dishonesty & Plagiarism

Presenting others' work as if it were your own, or providing such help to others, constitutes academic dishonesty. This is important not only due to fairness, but also so that instructors can provide feedback that is useful to improving your understanding and skills (feedback on work that is not your own is not useful to anyone!). Of course, in the case of group work the product will include input from all members, and of course, students may share data across groups or even classes when appropriate. Any work that you are presenting as your own (including reports, quizzes, etc) must be original to you. If you're struggling in class, please ask for help rather than resort to academic dishonesty! We are here to assist you if you have any concerns. SUNY Geneseo has instituted policies and procedures that must be followed in the event of an occurrence of Academic dishonesty which can be found here:

https://www.geneseo.edu/dean_office/dishonesty . Immediate consequences include a report to the department chair and Dean of the College and a loss of points on impacted assignment(s).