

# Genetics Laboratory

BIOL 305L

Spring 2018, Dr. Matthew (Moshe) Rhodes

Section 01- R 4:00 – 7:00

Section 02- W 1:15 – 4:15

Section 03- W 4:20 – 7:20

SSMB 141

Instructor:	Matthew Rhodes
TA:	Nicole Enright (enrightnm@g.cofc.edu)
Office:	SSMB108
Office Hours:	Tuesday 11 am to 12:30 pm Thursday 2 pm to 3:30 pm Or by appointment or if my door is open feel free to stop by
Email:	rhodesme@cofc.edu

## **Course description:**

An introduction to the principles of heredity using common experimental organisms. Recent techniques in molecular genetics are also covered. Laboratory three hours per week.

Prerequisites: BIOL 111/111L, BIOL 112/112L.

Co-requisites or prerequisites: BIOL 211 and 211D, BIOL 305, MATH 250 or equivalent course in statistics or permission of instructor

## **Learning Outcomes**

Students will

- Demonstrate the ability to explain data obtained from crosses.
- Understand Mendelian Genetics and common deviations.
- Apply basic statistical tools to genetics data.
- Demonstrate an understanding of the critical genetic concepts of mutations, alleles, and gene interaction, as well as the role of the environment in genotype-phenotype interpretation.
- Demonstrate an understanding of basic molecular genetic techniques.
- Exhibit proficiency for developing hypotheses and interpreting results on the basis of hypotheses.

- Format, analyze, communicate, and discuss experimental results.
- Understand some of the implications of modern genetics to society.

### **Text book and Note:**

None. Protocols and other information will be provided in class or posted on OAKS. Genetics is a challenging topic and as the laboratory is not required for the lecture, the classes may not line up. Additionally, for many of you it may be a while since you've taken genetics or gen bio. All "new" topics will be introduced in class. Whenever possible material will be made available online on OAKS as refreshers for topics covered in general biology classes. You are expected to review and make sure you are up to speed on those topics.

### **Important dates**

- W/R, January 10<sup>th</sup>/11<sup>th</sup>: First day of class (We will be meeting the first week)
- T, January 16<sup>th</sup>: Last day for Drop/Add
- Saturday, February 3<sup>rd</sup>: Storm makeup day (Why?)
- W, March 7<sup>th</sup>: Mid-term grades available
- T, March 13<sup>th</sup>: Last day to withdraw with W
- W/R March 21<sup>st</sup>/22<sup>nd</sup>: Spring Break, No Class
- W/R April 11<sup>th</sup>/12<sup>th</sup>: Final Presentations
- W/R April 18<sup>th</sup>/19<sup>th</sup>: Final Exam

Due dates for quizzes, cases studies and lab reports will be available on OAKS as we progress through the experiment

### **Planned experiments**

1. Mutagenesis in bacteria
2. Gene polymorphism: PTC tasting and VNTR variations in humans
3. Allelic series and molecular basis of phenotype in *Drosophila*
4. Allelism testing in yeast
5. Conjugation in Bacteria
6. Penetrance and expressivity in *Drosophila*
7. Phylogenetic tree building

### **Planned case studies**

1. Mutation types in cystic fibrosis
2. APC mutation in colon cancer
3. Rock pocket mice coat or stickleback fins

### **Experiments schedule**

Please check the accompanying Excel file. All experiments are conducted over multiple weeks. We will often be working on multiple experiments during a given week.

Please note: The schedule as it stands is tentative. There may be extenuating circumstances, including moving equipment, acts of nature, etc. that may necessitate the need to alter the schedule.

**Testing and grading:** (Approximately)

60% Individual Lab reports and Case Studies

10% Quizzes and other small assignments (Quizzes will cover background material and lab handouts). You should come to class having read through the procedures for the week.

15% Individual Final PowerPoint presentation

10% Final test

5% Lab performance (Attendance and Participation) and lab notebook

**Grading scale:**

92 and above: A

90-91.9: A-

87-89.9: B+

83-86.9: B

80-82.9: B-

77-79.9: C+

74-76.9: C

70-73.9: C-

67-69.9: D+

64-66.9: D

60-63.9: D-

below 60: F

**COURSE POLICIES**

○ **Lab Safety:**

A list of safety policy and procedures will be discussed in the first class. The document will be posted on OAKS for review and a lab safety quiz will need to be PASSED before you are allowed to work in the lab. Observance of all safety regulations is expected. There will be NO EXCEPTIONS. **Failure to follow the safety guidelines will debar you from performing the experiment** on the given day and you will **not** receive any grades for the same.

○ **Attendance:**

You are expected to do your share of the work. Many of the labs can get tedious, and it's unfair to expect your lab partner to do all the work if you miss a lab. So if you're sick, please **send me and your partner an e-mail** so that arrangements can be made. Most of the investigations may be impossible to make up. There is a possibility of a make up only if you can make arrangements with your partner and get yourself scheduled into one of the other sections of the BIOL 305L within the same week. **You are responsible for turning in any assignments that you might have missed.**

○ **Excessive absences:**

**Missing 2 laboratories will result in a "WA" grade (withdrawn excessive absence) at midterm and/or final grade. At midterm WA can still be changed to a regular final grade. A final "WA" grade is calculated as an "F" in your GPA. This is College policy.** This policy does not apply if the absences are due to a **SERIOUS** medical or personal reason and verification is provided.

○ **Electronic devices:**

You are encouraged to bring your laptop or tablet for every class, but they can only be used for class activities. Breach of that trust will lead to you losing that right. Occasional labs will require computer use. If you need to arrange to borrow a computer, please let me know. **Cell phones may be used only as cameras to document the experiments.**

○ **Lab reports:**

Reports are available on OAKS. There will be questions to answer and analyses to perform for each investigation. You must work closely with your partner to gather the data for most lab reports, but **please think and write independently.** Everyone should submit his/her **own** lab report with his/her **own** data analysis. The data in your lab report should be clear, legible and neat. **The stepwise calculations done to obtain the results should be shown, as you will be graded accordingly.** Reports are due in OAKS Dropbox on the date listed in the syllabus below BEFORE the start of your lab section. Lab reports not submitted on time **will be marked off 20% if submitted within 24 hours of the due date.** You have a week-long "grace period" in which you could submit your report for half credit, but reports will not be accepted thereafter.

○ **Lab Performance evaluation:**

It is important to clean the lab after your experiment by putting away the materials used in the right place, cleaning your culture bottles/apparatus used and keeping the area tidy. Failure to do so will be reflected in your lab performance evaluation. Do not let your partner do all the work.

You are also expected to either print the protocols for that day or have them available on your computer/tablet. Do not rely on your partner to do so.

Bring your notebook for each lab to record data and experiment details. These will be checked randomly during lab and failure to maintain a good lab notebook reflected in your performance evaluation.

- **Communication:**

Please feel free to contact me via e-mail whenever. **I will do my best to reply within one business day.** Panicked e-mails 2-hours before an assignment is due will most likely not get a response in time. Any questions about grading will be addressed in office hours or scheduled meetings only.

## **COLLEGE POLICIES**

- **Disability Services**

The College will make reasonable accommodations for persons with documented disabilities. Students should apply at the Center for Disability Services / SNAP, located on the first floor of the Lightsey Center, Suite 104. If there is a student in the class who has a documented disability and has been approved to receive accommodations through the Center for Disability Services / SNAP, please come and discuss this with me during my office hours.

- **Honor code and academic integrity**

Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when identified, are investigated. Each incident will be examined to determine the degree of deception involved. It has happened before and it will happen again. I can tell you stories...

Incidents where the instructor determines the student's actions are related more to a misunderstanding will be handled by the instructor. A written intervention designed to help prevent the student from repeating the error will be given to the student. The intervention, submitted by form and signed both by the instructor and the student, will be forwarded to the Dean of Students and placed in the student's file.

Cases of suspected academic dishonesty will be reported directly by the instructor and/or others having knowledge of the incident to the Dean of Students. A student found responsible by the Honor Board for academic dishonesty will receive a XXF in the course, indicating failure of the course due to academic dishonesty. This grade will appear on the student's transcript for two years after which the student may petition for the XX to be expunged. The F is permanent. The student may also be placed on disciplinary probation, suspended (temporary removal) or expelled (permanent removal) from the College by the Honor Board.

Students should be aware that unauthorized collaboration--working together without permission-- is a form of cheating. Unless the instructor specifies that

students can work together on an assignment, quiz and/or test, no collaboration during the completion of the assignment is permitted. Other forms of cheating include possessing or using an unauthorized study aid (which could include accessing information via a cell phone or computer), copying from others' exams, fabricating data, and giving unauthorized assistance.

Research conducted and/or papers written for other classes cannot be used in whole or in part for any assignment in this class without obtaining prior permission from the instructor.

Students can find the complete Honor Code and all related processes in the *Student Handbook* at

<http://studentaffairs.cofc.edu/honor-system/studenthandbook/index.php>

# COLLEGE *of* CHARLESTON

## SCHOOL OF SCIENCES AND MATHEMATICS

### **SAFETY POLICY AND PROCEDURES**

The School of Sciences and Mathematics of the College of Charleston understands that the safety of our students, staff and faculty is of paramount importance. Engendering a safety culture is an important part of our mission in teaching and doing science. Each department, course of instruction, or research lab may require higher standards or procedures. The policies and procedures set forth below are understood to be minimum requirements across our departments.

In this document, the term “laboratory” is meant for a work space/facility where chemicals, biological agents, or equipment is used for research and/or instruction.

No one (student, staff, faculty, or visitor) will be allowed in a laboratory (teaching or research) to perform experiments or where experiments may be in progress unless these regulations are followed.

Students dismissed from a teaching lab due to violations of the safety procedures will not be allowed to re-enter the laboratory until authorized to do so by their supervisor (instructor) and, in the case of research laboratories, by the department chair or designee. Any course work missed because of a violation of these guidelines cannot be made up at another time (or by an extension of the lab period) and will be treated as an unexcused absence.

1. You are responsible for knowing the biological, chemical, electrical, ergonomic, mechanical, and physical hazards associated with the equipment and materials that are being utilized in the laboratory. Listen to all instructions and ask questions about that which you do not understand.
2. Know the location of safety equipment: telephones, emergency shower, eyewash, fire extinguisher, fire alarm pull.
3. Know the appropriate emergency response procedures. If there is an injury or emergency, call 953-5611.
4. Do not work alone in the laboratory if you are working with hazardous materials or equipment.
5. Use hazardous chemicals, equipment, and biological agents only as directed and for their intended purpose.
6. Do not engage in horseplay, pranks or other acts of mischief while in lab.
7. Drinking, eating, and application of cosmetics is forbidden in laboratories where chemicals or biohazards are present. Smoking is forbidden in all College buildings.
8. Appropriate personal protective equipment shall be worn. The dress code for laboratory work when using chemicals, biological or physical hazards, or when instructed to do so by the laboratory supervisor is as follows:
  - a) Wear safety glasses or goggles at all times.
  - b) No exposed skin on arms, legs or torso.
  - c) Wear lab coats or other approved protective garments.
  - d) Wear gloves or other personal protective equipment (PPE) as directed by the instructor or mandated by prudent practices based on the chemicals being handled. If in doubt, wear appropriate gloves. Latex is not permitted. Avoid cross-contamination.
  - e) Remove PPE (gloves and lab coat) when exiting the laboratory.
  - f) Wash your hands, even if gloves were used, before leaving a lab where you did any lab work.

g) Closed toe shoes are required. The heel and top of foot must be covered. High heeled shoes, sandals, and perforated shoes are not permitted.

h) Confine long hair and loose clothing.

9. Inspect equipment or apparatus for damage before adding chemical reagents or biological samples or energizing electrical equipment. Do not use damaged equipment.

10. Never remove chemicals, biological samples, or laboratory equipment from a lab without proper authorization.

11. Presume that all chemicals and biological samples used in the laboratory are hazardous for you and the environment, unless instructed otherwise.

12. Never leave an experiment unattended unless proper safety precautions are in place.

13. Read all labels on chemicals twice before using them in the lab. Read all instructions twice for the operation of any equipment or machinery.

14. Properly and safely dispose of all waste materials.

15. Treat sharps and broken glassware containers carefully.

a) Broken glass should be disposed of in properly marked safety containers. All sharps (needles, razor blades, etc.) used for any purpose must be disposed of in specially labeled SHARPS containers.

b) Do not place contaminated glass in the broken glassware container. Consult your supervisor. c) Waste chemicals and contaminated PPE should be discarded as directed.

16. When using a reagent, replace the lid immediately. Never return unused reagents to stock bottles. Take only the amount needed for your experiment.

17. All chemicals and biological samples/media are to be disposed of in appropriately labeled containers. Specific instructions for each material will be provided. Pay attention to waste container labels before adding the material to be discarded.

18. Use good personal hygiene. Keep your hands and face clean. Wash hands thoroughly with soap and water after handling any chemical or biological agent.

19. Keep the work area clean and uncluttered with chemicals and equipment. Clean up the work area on completion of an operation or an experiment. Before leaving the laboratory, you are responsible for making sure your lab area is clean and organized.

20. Never store a chemical or biological specimen in an unlabeled container.

20. Always have your College of Charleston identification and insurance information with you when working in a laboratory. MedicAlert identification must be worn if you have any potential life-threatening chemical sensitivities or medical conditions.

21. Report any accident or injury, however minor, to your teaching assistant, instructor, or lab supervisor immediately. An accident report form must be completed and forwarded to the department chair, dean, and to the Director of Environmental Health and Safety.

**If you have questions/concerns about safety in the lab please first consult your instructor. If these are not answered, please see the department chair. Finally, you may consult the director of Environmental Health and Safety, Randy Beaver at 3-6802 or [beaverr@cofc.edu](mailto:beaverr@cofc.edu)**

**Adopted: March 7, 2012**



## CougarAlert

The College of Charleston has an agreement with the Blackboard Connect Inc. [formerly The NTI Group, Inc. (NTI)] to use its Connect-ED communication software to provide an emergency notification system that is capable of reaching students, faculty, staff and parents within minutes of a campus crisis. This system is called **CougarAlert**.

### Information for Students

The CougarAlert emergency notification system will contact up to six phone numbers for the student. Students may include family member numbers in their address and phone number information.

**All students should log onto [MyCharleston](#) to review their address and telephone information and update as needed.**

To access the address and telephone information, follow these steps:

1. Log on to [MyCharleston](#)
2. Click on the Academic Services tab
3. Click on the Banner Self-Service link in the third column
4. Click on the Personal Information link
5. Click on the Update Address and Phones and Cougar Alert link

The CougarAlert system will pull the phone number in the following order – cell phone with text messaging option, cell phone without text messaging option, residence hall room phone number, mailing phone number, home phone number, parent phone number and parent 2 phone number.

If you do not have one of these numbers in your student record, the system will select the next number on the list. To avoid issues related to timely communication of emergency messages to the proper places, every student must update his or her contact information in [MyCharleston](#) with current accurate information.

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## CougarAlert Display Information

When you receive an emergency message from the College of Charleston's CougarAlert System, the return e-mail address will be displayed as cougaralert@cofc.edu, and Caller ID will be displayed as 843.725.7246 (this is the College's Emergency Information Hotline).

### Testing and Implementation

*Testing will be conducted each semester* to verify all systems are operating properly. The campus community will be notified via e-mail and web page postings when testing of the system will be conducted.

### Blackboard Connect Software

[Blackboard Connect](#) is an emergency communication software that sends notification before, during and after an emergency. With this new system, the College will be able to communicate in many modes, including voice messages to home, work and cell phones; text messages to cell phones, PDAs and other devices; written messages to e-mail accounts; and messages to teletypewriters and telecommunication devices (TTY/TDD) for the hearing impaired. In combination with our existing communications methods and emergency response plans, this new notification system will significantly enhance the College of Charleston's ability to maintain a learning environment in which students are safe, secure and comfortable.

In an emergency, communications to the campus will be issued in the following priority order:

1. Message to the [Blackboard Connect](#) Emergency Notification System (phone and e-mail).
  2. Recorded message to the College's Emergency Information Hotline, 843.725.7246.
  3. Update to the Website.
  4. Printed update sheets to be distributed and posted on campus (if necessary).
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The CougarAlert system will only be used to notify you in the event of a campus crisis or emergency.