

Molecular Biology Lab. Spring 2016 syllabus

LABORATORY MEETING TIME:

Friday 12-3 pm in SSMB 141.

The first lab. will be on Friday Jan. 15 2016.

Please bring your laptop/tablet to every lab.

INSTRUCTOR: Agnes Southgate, PhD.

Office: HWWE 306.

Phone: 953-6544 (not very efficient due to teaching and meetings etc.).

E-mail: southgatea@cofc.edu (FAR BETTER !).

Office times: Friday 10:30am-till lab time in SSMB 141 and if you cannot come at these times, set up an appointment with me by e-mail, and we can find a good time for both of us.

UNDERGRADUATE CATALOG: BIOL 312 L Molecular Biology Laboratory (1)

A comprehensive study of the techniques used in the isolation and analysis of important cellular macromolecules. Techniques covered will include electrophoresis of proteins and nucleic acids, southern and western blotting, liquid chromatography and those involved in the formation and analysis of recombinant molecules. Laboratory three hours per week.

Co-requisite or prerequisite: BIOL 312, MATH 250 or equivalent course in statistics or permission of instructor. <http://catalogs.cofc.edu/undergraduate/biol-312l-molecular-biology-laboratory-1.htm>

Learning outcomes in this course:

1. Knowledge and practice of basic laboratory safety
2. Practical skills:
 - a. Learn to isolate and purify DNA from different sources.
 - b. Be able to perform and analyze a PCR reaction
 - c. Be able to manipulate RNA in the laboratory including isolation, quantification, and detection of a specific mRNA using RT-PCR
 - d. Be familiar with modern DNA sequencing methods and genome determination
3. Be able to use readily available databases for the modern molecular biology lab
4. Learn to write scientific reports
5. Learn to read and discuss scientific literature
6. Know how to work cooperatively in a molecular biology lab

Content information

There is no book or manual to buy for the lab.

Course materials, including the syllabus, study guides, handouts, protocols and accompanying papers, etc. will be made available through OAKS.

Instructions for lab reports and other assignments will be available on OAKS

Some of the quizzes will be given on OAKS

Make sure to check the OAKS site frequently. If you are not familiar with OAKS, please let me know. Instruction is also available from the Library.

Student behavior in the lab.

Be on time and familiar with the lab experiment for that day: the faster we start, the sooner we are done...

Turn off (or put in silent mode) cell phones and other devices that beep. Do not talk on the phone or text message!, do not use Facebook or conduct web searches not associated with assignments during the lab. section.

Students are expected to behave properly in the lab: no chit-chatting, no rough playing, no playing with expensive instrumentation and potentially dangerous materials.

Students are expected to help with cleanup after their lab.

Students should not leave the lab classroom until the instructor has indicated that the lab activity is over.

Do study, ask questions, and be courteous to your colleagues.

Bring your enthusiasm – it is contagious.

Tips for Success:

- Attend all labs
- Be an active participant
- When confused, ask for help – from the instructor and friends,
- DO NOT FALL BEHIND before this becomes a reality, get help ASAP

Lab attendance policy,

Regular attendance is positively correlated with success in any course. Class attendance and participation is, therefore, strongly encouraged. Based on the instructions below, a student who misses two lab periods will be dropped from the course with a grade of WA.

FROM <http://catalogs.cofc.edu/undergraduate/attendance.htm>

“Since lab. attendance is a crucial part of any course, students are expected to attend all laboratory meetings in which they enroll. The professor determines whether absences are excused or unexcused, whether make-up works will be permitted (if possible), and how the number of unexcused absences count in determining the basis for a grade of "WA." If attendance is used for grading purposes, the professor is responsible for keeping accurate attendance records. Each student, whether absent or not, is responsible for all the information disseminated in the course *i.e.* all material posted on (see above). If a student has more than the maximum allowed absences, as defined in the course syllabus, the professor may assign a grade of "WA" for the student. The grade of "WA" is a failing grade. The procedure for assignment of this grade requires that the professor submit the WA grade form after the withdrawal deadline.”

Student responsibility for safety compliance

Students are required to follow the strict and standard safety procedures outlined in the School, of Science and Math (SSM) safety policy and procedures document posted on OAKS



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.

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.

<http://ssm.cofc.edu/pdf-files/SSM%20Lab%20Safety%20Policy%20Adopted%20March%207%202012.pdf>

In the first laboratory, we will go over this important CofC safety policy. You will have to take the safety quiz on OAKS, as well as sign a copy of this policy that will be kept in my office for min. two years.

By signing, you agree that you

- understand the potential safety dangers in this lab.,
- know how to deal with any potential accident and also
- agree to the CofC's requirements stated in this policy.

If you do not sign this document, you will not be able to stay in this course.

We will talk more in the first lab.

REMEMBER:

College of Charleston Campus Emergencies: 843.953.5611

Non-emergency: 843.953.5609

Department Directory

General Information: 843.953.4980,

Crime Action Line: 843.953.4998,

Records Coordinator: 843.953.7825,

Fire and EMS: 843.953.5499

Hearing Impaired Phone: 843.953.1419

HONOR CODE AND ACADEMIC INTEGRITY

Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when identified, are investigated. Each instance is examined to determine the degree of deception involved.

Incidents where the professor believes the student's actions are clearly related more to ignorance, miscommunication, or uncertainty, can be addressed by consultation with the student. We will craft a written resolution designed to help prevent the student from repeating the error in the future. The resolution, submitted by form and signed by both the professor and the student, is forwarded to the Dean of Students and remains on file.

Cases of suspected academic dishonesty will be reported directly to the Dean of Students. A student found responsible for academic dishonesty will receive a XF 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 X to be expunged. The student may also be placed on disciplinary probation, suspended (temporary removal) or expelled (permanent removal) from the College by the Honor Board.

It is important for students to remember that unauthorized collaboration--working together without permission-- is a form of cheating. Unless a professor specifies that students can work together on an assignment and/or test, no collaboration is permitted. Other forms of cheating include possessing or using an unauthorized study aid (such as a PDA), copying from another's exam, fabricating data, and giving unauthorized assistance.

Remember, 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 professor.

Students can find a complete version of the Honor Code and all related processes in the *Student Handbook* at http://www.cofc.edu/studentaffairs/general_info/studenthandbook.html.

SPECIAL REQUESTS

If there is a student in this class who has a documented disability and has been approved to receive accommodations through SNAP Services, please feel free to come and discuss this with me during my office hours.

Any student eligible for and needing academic adjustments or accommodations because of a disability is requested to speak with the professor in a timely manner so that your needs can be addressed.

The College will make reasonable accommodations for persons with documented disabilities. Students should apply for services at the Center for Disability Services located on the first floor of the Lightsey Center, Suite 104. Students approved for accommodations should notify their professors as quickly as possible.

This College abides by section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act that stipulates no student shall be denied access to an education "solely by reason of a handicap." Disabilities covered by law include, but are not limited to, learning disabilities and hearing, sight or mobility impairments. If you have a documented disability that may have some impact on your work in this class and for which you may require accommodations, please see an administrator at the Center of Disability Services, (843) 953-1431 or me so that such accommodation may be arranged.

The Developmental Biology (DB) Lab. is combined with the DB classes that is 20 % of the total grade (1000 points in the lectures and 250 points in the lab. part. 50 points of the lab. grade will be associated with the lecture 200 point final (May 1st 2015), thus leaving 200 points in the lab. part of lab. grade.

CONFIDENTIALITY OF STUDENT RECORDS

The Family Educational Rights and Privacy Act of 1974 (FERPA) is a federal law designed to provide students with greater access to and control over information contained in their educational records, while at the same time prohibiting, in most circumstances, the release of *any information* contained in those educational records without express written consent of the student. This law guarantees privacy of student records, open access by students to their records, restricted release of information to specified authorities or others only with written consent, and procedures allowing students to challenge the contents of their records. The law also requires that an inventory of records be maintained denoting the location, content, and any official review of students' records and identifying the staff member in charge of records and/or reviews. Notice of this law must be provided annually to all students. Forms necessary for obtaining access to student records are provided by the Office of the Registrar.

THIS IS WHY I CANNOT INFORM YOU FOR A REQUEST FOR YOUR GRADES ETC. BY E-MAIL OR THE TELEPHONE AT THE END OF THE SEMESTER. THE ONLY LEGAL

OPTION IS PERSON – PERSON COMMUNICATIONS I.E SEEING EACH OTHER IN PERSON.

OTHER ISSUES:

We need to discuss inclement weather contingency plan during the first week of classes, in case we have bad weather and classes are cancelled

Although there are two designated storm days on the academic calendar, their use is rarely optimal for preventing uninterrupted instruction. Faculty used different approaches to keep their students engaged and learning even when classes are cancelled, but this is difficult with a lab class; so let's hope this winter will not be as bad.

The Flu: At this point we do not know how severe the second part of the flu season will be. However we should all be prepared for the worst-case scenario. If you have the flu, please do NOT come to class until you are well. Please DO contact me by email or phone. I will be as flexible as possible to help you. Even though late, you can still get a flu shot (it's free).

Grading

- Reports 55%
- OAKS, class quizzes, and homework 15%
- Presentation 20%
- Respect for safety rules: you will start with 100 points, each infraction will result in 15 points lost. 5% of grade
- Lab participation, attitude, and experiment completion 5% of grade

GRADE SCALE:			
93 and above: A	80-83.9: B -	67-69.9: D ⁺	
90-91.9: A -	77-79.9: C ⁺	64-66.9: D	
87-89.9: B ⁺	74-76.9: C	60-63.9: D -	
84-86.9: B	70-73.9: C -	below 60: F	

Molecular Biology lab (BIOL 312L-; Spring 2016 Tentative schedule

01/15/15

In lab

- ●Safety: PowerPoint and ●CofC's Safety Policy
- ●Pipetting exercise
- ●Understanding the SI system
- ●Understanding concentrations and dilutions

Before next week lab:

OAKS Quiz on safety

Practice dilutions/concentration

Read information on PTC

01/22/16

In lab

Class quiz on dilutions/concentration

Instruments in the lab and how to use them

Experiment #1 PTC mutation: Cheek DNA extraction and PCR set up

Before next week lab:

OAKS Quiz on PCR

Read information on Restriction enzyme digest and gel electrophoresis

01/29/16

In lab

Experiment #1 PTC mutation continued: Restriction enzyme digest and gel electrophoresis

Introducing experiment #2; need to think of a potential mutagen for next week

Before next week lab:

OAKS Quiz on Restriction enzyme digest and gel electrophoresis

02/05/16

In lab

Experiment #1 PTC mutation continued: Discussion on gel data and significance

Report #1 due 02/12 on OAKS

Discussion: what makes us human???

Experiment #2: mutagenesis testing

Set up assays and incubate at 37°C

02/12/16

In lab

Experiment #2: mutagenesis testing

Collect data and recover colonies which have reverted, perform DNA PCR for TrpE gene

Before next week lab:

OAKS Quiz on Ames testing

02/19/16

In lab

Experiment #2: mutagenesis testing

Note: we will run the gel for these reactions before lab

Isolate DNA from gel fragment, OD, and set up ligation in pGEMT

02/26/16

In lab

Experiment #2: mutagenesis testing

Bacterial transformation with ligation

Experiment #3: Understanding gene transcription part I: *Drosophila* and effect of flight on gene expression using genetics as an approach

Part a) dissection and RNA extraction.

Part b) setting up RT-PCR reactions on assigned genes

Before next week lab:

OAKS quiz on basic of cloning

Download gene and mRNA sequence for assigned genes. Find positions of primers and predict expected fragment sizes

03/05/16

In lab

Experiment #2: mutagenesis testing

We will have started liquid cultures for positive colonies

Perform plasmid DNA extraction and set up restriction digests

Experiment #3: How to study gene transcription part I: *Drosophila* and effect of flight on gene expression

Part c) gel electrophoresis of PCR reactions

Before next lab:

Read assigned review paper

Spring Break

03/19/16

In lab

Experiment #2: mutagenesis testing

Run gel electrophoresis on RE, OD and set for sequencing

Experiment #3: How to study gene transcription part I: *Drosophila* and effect of flight on gene expression

Discussion of data from gel in context of information from review paper

Report due 03/26 on OAKS

Discussion: how do we relate this to health?

03/26/16

In lab

Experiment #2: mutagenesis testing

Discuss sequencing data

Report due 04/03 on OAKS

Experiment #4 How to study gene transcription part II: Introduction to the European honey bee project (*Apis mellifera*) RNA sequencing discussion

qRT-PCR discussion and set up

Before next week lab:

OAKS quiz on qRT-PCR and *Apis* project

04/03/16

In lab

Experiment #4: Discussion qRT-PCR data

Report due 04/10/16 on OAKS

Discussion: how do we use the RNA sequencing technique to understand cell determination?

Experiment #5: *C elegans* and RNA interference

Introduction to *C elegans* model system

Setting up RNAi plates. We will use the RNA interference (RNAi) technique that allows you to silence the expression of a chosen gene by specifically degrading the gene's mRNA and observing phenotypes.

First set of presentations

Before next week lab:

OAKS quiz on *C elegans* system.

04/10/18

Experiment #5 continued: check *C elegans* plates and record phenotypes. Take pictures and count % of interference

Bioinformatics exercise on dumpy gene

Report due 04/17 on OAKS

Second set of presentations

04/17/18

Third set of presentations