

BBC Genetics Lab
PCB 3063L – B51&52
Florida International University
Fall 2018

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Office: MSB 250G

Office Hours: Monday 9-11am, Thursday 10am-12pm

Location, location, location... PLUS timing is everything!

Laboratory: Wednesday 9-11:50am MSB 220A

Thursday 12-2:50pm MSB 220A

What you will learn in the lab...

As a support for the Genetics Lecture, this lab is designed to give you a flavor of what the life of a scientist working in the specific area of genetics research is like.

We will go over concepts from two main fields in Genetics: Genetics of Inheritance (which describes how traits are inherited) and Molecular Genetics (which explains why those traits occur and how they are produced).

These general concepts of genetics will be put into practice through hands-on experiments, highlighting the importance of the experimental design, the analysis of data and the interpretation of results.

But most importantly, the thread of the whole course will be the performance of a small research project from beginning to end, exploring the different aspects that research in genetics involves. You will go through literature about the topic, the statement of hypothesis, perform an experiment to test that hypothesis, analyze the data and draw the main conclusions from it. All this work will finally crystallize into a final paper (in the fashion of a primary research scientific article) where all the work will be described to your peers according to the scientific standards.

You will be guided through every step of this first-time comprehensive research experience, but your creativity and initiative will be critical to make the best out of it. Get ready to walk in a real researcher's shoes!

The major goals of the course are...

1. Understanding how scientific communications are structured. You will be able to spot the differences between the basic standard sections of a primary research article in order to efficiently browse the information that it contains as well as to be able to communicate your own work using an academic style. Additionally you will develop a critical attitude when reading scientific and "not-so-scientific" literature. Not all the information available is truly reliable, thus in scientific publishing it is common to rely on the peer review process. In this course, you will have the chance of playing the role of a reviewer while practicing your comprehension skills and your constructive criticism.

2. Understanding the basic principles of heredity and the statistics that they involve.

You will go over general concepts of the Mendelian inheritance (and variations) as well as the Polygenic inheritance, which you have probably seen already in other courses (If not, don't worry! It will be covered in the lab). Next, you will make observations of traits that are coherent with those models of inheritance in order to test different hypotheses and to make predictions, using the necessary statistical methods.

3. Getting introduced to Bioinformatics. In the current Information Age, which happens to overlap with the Post-Genomic Age of our specific field of interest, lots and lots of data and information are accessible through online resources. For a researcher in Genetics or Genomics, it is critical nowadays to acquire a basic training in Bioinformatics to manage this novel way of providing scientific information as well as to perform *in silico* experiments. Thus, an introduction to databases and basic software tools relevant for genetics/genomics research will be included in this course.

4. Learning and practicing basic techniques of molecular genetics. As a wet-lab experience, you will learn hands-on the basics of common techniques in a Genetics Lab such as isolation of DNA, the Polymerase Chain Reaction (PCR), the DNA digestion using a restriction enzyme and the Gel electrophoresis analysis. Additionally, you will get (re-)trained in basic laboratory procedures that most techniques require, like pipetting and using the centrifuge.

5. Linking the different aspects of research to build up a complete scientific work. This is probably the most particular and important goal of this lab. All the different contents and skills that you will learn and acquire through the semester serve one single purpose; to fully develop a sound and coherent research project. The work carried out in the lab during different sessions will have to be synthesized by the end of the course, and in order to succeed in this goal, we will also have to learn how to make a correct use of a lab notebook. You will build a realistic scientific work by stating hypotheses, gathering information from adequate literature, performing manual lab-work as well as computational work, analyzing data and writing about all that as a professional scientist.

Materials you will be using...

There is no required book or lab manual. The necessary materials and readings will be provided through the associated Blackboard course. You will just have to print the handouts provided. Additionally, you will need to keep a lab notebook (please, no ring binders) that will be updated daily.

You need to wear a lab coat and closed-toe shoes to be allowed into the lab

You will be graded based on...

- 1. Exams:** There will be two exams during the course: a midterm exam and a final exam. The dates for those exams will be announced in the schedule posted on Blackboard.
- 2. Written assignments:** The lab proposal and the lab report (final paper) are your two big written assignments. These will be assessed both in terms of contents and format. A grading rubric will be provided to better understand what is required for a good accomplishment of these tasks.

3. **Peer review exercise:** Your draft manuscript for lab proposal will be reviewed by one of your peer classmates. Each student will review another student's manuscript. A peer review report must be submitted by the specified deadline to be graded.
4. **Presentation:** The presentation of the work will be carried out in groups. Each member of the group will present a different part of the work and the grade will be the same for all the members. More details about the development of the presentation will be explained in class. ***The presentation is a mandatory requirement to pass the course***
5. **Lab notebook:** The notebook will be graded throughout the course by including questions about lab activities.
6. **Quizzes:** Each day of class there will be a quiz including contents of the previous lab session and contents of the current session. The quiz will be carried out at the beginning of the class to account for punctual attendance.

Your final grade will be calculated as follows...

The overall grade is calculated as a percentage, being the max. 100%, distributed as follows:

- Quizzes (average): 10% ***the lowest quiz grade will be dropped
- Peer review report 10%
- Research proposal assignment: 10%
- Midterm exam: 15%
- Presentation: 5%
- Lab notebook: 10%
- final paper: 20%
- Final exam: 20%

Each assignment will fit into the following point system for easy calculation, out of a total of 900pts:

- Quizzes: (10pts/quiz) 100pts
- Research proposal: 100pts
- Midterm exam: 150pts
- ~~Presentation: 100pts~~
- Lab notebook: 150pts
- Final paper: 200pts
- Final Exam: 200pts

According to the points and corresponding % you can calculate your final grade:

A	93 % - 100%
A-	90 % - 93 %
B+	88 % - 90 %
B	83 % - 88 %
B-	80 % - 83 %

C+	78 % - 80 %
C	70 % - 78 %
D	60 % - 70 %
F	<60%

Weekly tasks and Objectives

All tasks, learning objectives, readings, and home assignments are specified in corresponding Blackboard week module. There will be a quiz every start of lab session about assigned readings and contents seen in previous sessions.

-----Note on professional and academic integrity -----

Academic Misconduct:

Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, the rigorous and respectful exchange of ideas, and community service. All students should respect the right of others to have an equitable opportunity to learn and honestly demonstrate the quality of their learning. Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational mission of the University. All students are deemed by the university to understand that if they are found responsible for academic misconduct, they will be subject to the Academic Misconduct procedures and sanctions, as outlined in the Student Handbook.

Academic Misconduct: Full handbook and information can be found at:
<http://www.fiu.edu/~oabp/misconductweb/1acmisconductproc.htm>

DEFINITION OF ACADEMIC MISCONDUCT: Academic Misconduct is defined as the following intentional acts or omissions committed by any FIU student:

1.01 Cheating: The unauthorized use of books, notes, aids, electronic sources; or assistance from another person with respect to examinations, course assignments, field service reports, class recitations; or the unauthorized possession of examination papers or course materials, whether originally authorized or not. Any student helping another cheat may be found guilty of academic misconduct.

1.02 Plagiarism: The deliberate use and appropriation of another's work without any indication of the source and the representation of such work as the student's own. Any student who fails to give credit for ideas, expressions or materials taken from another source, including internet sources, is guilty of plagiarism. Any student helping another to plagiarize may be found guilty of academic misconduct.

1.08 Academic Dishonesty: In general, by any act or omission not specifically mentioned above and which is outside the customary scope of preparing and completing academic assignments and/or contrary to the above stated policies concerning academic integrity.

TURN-IT-IN plagiarism software will be used to check all written reports for plagiarism. If plagiarism is found to exist, YOU WILL RECEIVE AN "F" FOR THE CLASS.

*****Syllabus subject to change*****

By signing this form, I am stating that I have read this form and understand the expectations for the course.

Print name: _____

Signature: _____

Date: _____