

# Genetics Laboratory – PCB 3063L

## Fall 2014

1 Credit hour

Laboratory Coordinator: Dr. Laurence von Kalm  
Office BIO 433

Instructors: Ms. Nicole Barnette (Sections 13 and 14)  
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Office hours: Wed and Fri 12-2pm

Please allow 24 hours for a response to emails (response times will be longer on weekends)

**Laboratory Manual:** *Genetics Laboratory Investigations*, 13<sup>th</sup> ed. 2007  
by Mertens and Hammersmith  
Pearson Custom Publishing/Prentice-Hall

**Course materials:** one composition notebook will be required

**Course website:** Access our course website at [Webcourses@UCF](mailto:Webcourses@UCF) via the myUCF portal <https://my.ucf.edu/> using your NID and NID password. There you will find all course material including powerpoints, data analysis problem sets, and online homework.

**\*\*\* OPEN TOED SHOES CANNOT BE WORN IN THE LABORATORY \*\*\***

## **Course goals:**

Upon completion of this course students will be able to:

- Utilize genetic laboratory tools such as: pipettes, micropipettes, glassware, spectrophotometer, and dissecting microscope
- Identify phenotypes in a living organism
- Write a lab report
- Interpret a pedigree and karyotype
- Perform a punnet square to assess genetic and phenotypic outcomes
- Demonstrate knowledge of: PCR, restriction enzyme digestion, and the connection between gene, protein and phenotype

## **Course description:**

Expand your understanding of genetics through hands on experimentation. This course is an introduction to a broad range of genetic laboratory techniques. Participation in multi-week projects will allow groups to demonstrate key genetic concepts in a hands-on manner. Additional emphasis will be given to data collection, analysis, and presentation in written lab reports.

## **Behavior in class:**

It is assumed that all students will act in a mature manner in the classroom, showing consideration for their peers and the instructor. Any student who consistently distracts other students or the instructor will receive a penalty of one letter-grade on the final grade. Seriously disruptive behavior will cause the student to be removed from the course and face disciplinary action for student misconduct.

All electronic devices must be turned off or set to silent mode in the classroom.

## **Lab Safety:**

**NO food or drink** is allowed in the lab at any time. Water bottles must stay in backpacks.

**\*\*\* OPEN TOED SHOES CANNOT BE WORN IN THE LABORATORY \*\*\***

### **\*\*\* Important safety note for a woman expecting a child - Lab 8: Gene action**

Lab 8 will require the use of toluene. Since toluene is listed as "possible risk of harm to the unborn child" any pregnant student will be excused from taking this lab. Please communicate your situation to the instructor and bring a statement from your physician. If you have any medical condition that makes you sensitive to toluene we need to know as well. We always follow stringent safety procedures, but in case of an accidental spill these students should not be present in the lab.

## **Financial Aid Compliance**

As of Fall 2014, faculty are required to document students' academic activity at the beginning of each course. Completion of the Pretest assignment given during the first class will be used for this purpose. If you add the course after this time contact your instructor as soon as possible. It must be completed no later than August 27. Failure to do so will result in delay in the disbursement of your financial aid.

## GRADING:

**The final grade will be rounded up if 0.5 points or less away from the upper letter (e.g. 87.50 is an A) only if all course work is completed and on time. There will be no exceptions to this policy.**

Grade Range %	Letter Grade	GPA
88 - 100	A	4.0
77 - 87	B	3.0
66 - 76	C	2.0
55 - 65	D	1.0
below 55	F	0

Note: the University considers any GPA above 0 a passing grade. Specific Program requirements may vary.

**Cheating = automatic F and referral to The Office of Student Conduct for disciplinary action.**

### Grade components:

1) Tests (20% of grade)

There will be two tests during the semester, each worth 10% of the final grade. Tests will be short answer based on information in power points, homework assignments and data analysis questions. There will be calculations that require a calculator. **Bring a calculator for both tests.**

If you fail to attend a test for any reason you must provide documented evidence that circumstances beyond your control prevented you from taking the test. Failure to provide reasonable documentation will result in a grade of 0 for the test. If the reason for missing the test is acceptable to the instructor a makeup test will be scheduled.

If you arrive late for a test you will be allowed to take the test. However, you must turn in the paper at the regular scheduled end of the test. You will not be allowed extra time unless a documentable emergency has occurred (in which case we will reschedule the test).

The test will commence at the beginning of the lab period on the scheduled day and will end at the scheduled end of the lab period. **Students cannot keep any part of the test and all pages must be turned in for grading. Any student turning in a test paper that is missing pages or who attempts to steal a test will receive an automatic F for the entire course and face disciplinary action for student misconduct.** Test scores will be posted on the Grades page of Webcourses. Students are strongly encouraged to review their tests with their instructor.

2) Practical Exam (10% of grade)

There will be one practical exam given for the course. Attendance requirements are the same as described above for tests. It will cover basic lab techniques learned throughout the course. The test will include physical manipulation of laboratory tools along with short answer and multiple choice questions about their use.

3) Lab Reports (30% of grade)

Two written lab reports each worth 15% of the grade each will be done based on group work.

**Time outside of the assigned laboratory hours is required for this part of the lab.**

**Instructions for the experimental approach and written lab reports are on Webcourses.**

Rough drafts of lab reports will be reviewed by the instructor and final drafts should address all comments to receive full credit. Failure to turn in a rough draft may result in a considerably lower grade on the final report.

- a. Lab Report 1 – Groups of 2-3 students will study the inheritance pattern of a single mutant eye phenotype. Each student will turn in an individual written lab report.
  - b. Lab Report 2 – Groups of 4-5 students will study the inheritance pattern of two mutant traits. Groups will prepare one collaborative written lab report. Your final grade for this exercise will be influenced by peer evaluation of your relative level of contribution; *i.e.*, your group partners will grade your contribution on a scale of 0-100%. For example, if your joint lab report receives a grade of 100% and your partners estimate your relative contribution to be 60%, your final grade for the lab will be 60% of 25 points = 15 points. An average taken from all members of the group will be used to calculate the percent effort for each person. Peer assessment will be anonymous. Complaints about the contribution of a student in your group must be communicated to the GTA prior to the final peer evaluation; otherwise your grievances will not be taken into consideration.
- 4) Lab based assignments (total of 40% of grade) – **Attendance:** If you arrive more than 30 minutes late, leave early or miss a lab without an acceptable documentable excuse you will not receive a grade for that lab's quiz, participation, or data analysis (a total of 3% of your grade). Missing or failing to complete more than one lab exercise without acceptable documented excuse will result in **additional penalties** as follows. A second or third missed lab will result in double penalty (6% each). In other words, missing three labs will cost you 15% of your grade. A fourth lab missed = automatic F. If you know you are going to miss a lab see your instructor before the lab and have a documentable reason.
- a. Quizzes (10%) – 10 quizzes will be given throughout the semester. The quizzes will be based on the previous lab experiment and lecture. Quizzes will be short-answer format and may require calculation. If you arrive at lab after the quiz has started you will not be permitted to take the quiz. You can prepare for the quizzes by reviewing power points, completing data analysis questions, and online homework.
  - b. Participation (10%) – Based on in class interaction. Active involvement in all experiments is expected and required.
  - c. Online homework (10%) – This will be made available after each lab. Online homework will review concepts covered in the power points and provide practice for calculations covered in lab. Online homework will be due in two sets. HW 1-5 will be due at the time of Test 1. HW 6-10 will be due at the time of Test 2.
  - d. Data analysis (10%) – Ten data analysis problem sets will be due at the beginning of the next class following completion of the experiment. Data analysis problem sets will involve analysis and review of the in class experiment and will have short answer and graphing questions. Late lab reports without a documentable excuse will not receive a grade.

There is no final exam during finals week for this course.

## SCHEDULE OF LABORATORY EXERCISES

August 18<sup>th</sup>/19<sup>th</sup> – LAB 1: Principles of probability, punnet squares, Chi squared test

- Syllabus review
- Grades: Participation 1

August 25<sup>th</sup>/26<sup>th</sup> – LAB 2: Start Group Project 1 (Lab Report 1)

- Fly handling introduction
- Grades: Participation 2, Quiz 1, Data Analysis 1

**Sept 1<sup>st</sup>/2<sup>nd</sup> – Labor Day NO CLASS**

Sept 8<sup>th</sup>/ 9<sup>th</sup> – LAB 3: Chromatographic characterization of Drosophila melanogaster mutants

- Grades: Participation 3, Quiz 2, Data Analysis 2 (based on group project and fly handling)

Sept 15<sup>th</sup>/16<sup>th</sup> – LAB 4: Polytene Chromosomes from Drosophila salivary glands

- Grades: Participation 4, Quiz 3, Data Analysis 3

Sept 22<sup>nd</sup>/23<sup>rd</sup> – LAB 5: Population genetics: The Hardy-Weinberg principle

- Grades: Participation 5, Quiz 4, Data Analysis 4

Sept 29<sup>th</sup>/30<sup>th</sup> – LAB 6: Human chromosomes and applied human genetics, Start Group Project 2

- **Lab Report 1 Rough Draft Due**
- Grades: Participation 6, Quiz 5, Data Analysis 5

Oct 6<sup>th</sup>/7<sup>th</sup> – **TEST 1 (labs 1-5)**

- Rough Draft Lab Report 1 returned
- Online HW 1-5 Due

Oct 13<sup>th</sup>/14<sup>th</sup> – LAB 7: Isolation of DNA

- **Lab Report 1 Final Draft Due**
- Grades: Participation 7, Quiz 6 (on lab 6), Data Analysis 6

Oct 20<sup>th</sup>/ 21<sup>st</sup> – LAB 8: Gene action: Synthesis of B-galactosidase in E. coli

- Grades: Participation 8, Quiz 7, Data Analysis 7

**(Oct 27<sup>th</sup> – withdrawl deadline )**

Oct 27<sup>th</sup>/28<sup>th</sup> – LAB 9: DNA Restriction enzyme digestion and polymerase chain reaction Part 1

- Grades: Participation 9, Quiz 8, Data Analysis 8

Nov 3<sup>rd</sup>/4<sup>th</sup> – LAB 10: DNA Restriction enzyme digestion and polymerase chain reaction Part 2

- **Lab Report 2 Rough Draft Due**
- Grades: Participation 10, Quiz 9

Nov 10<sup>th</sup>/11<sup>th</sup> – **Veteran's Day NO CLASS**

- Students come to office hours to get back rough draft

Nov 17<sup>th</sup>/18<sup>th</sup> – **Practical Exam**

- **Lab Report 2 Final Draft Due**
- Grades: Quiz 10, Data Analysis 9 and 10

Nov 24<sup>th</sup>/25<sup>th</sup> – **TEST 2 (labs 6-10)**

- Online HW 6-10 Due