

# Genetics Laboratory – PCB 3063L

## Spring 2015

1 Credit hour

Laboratory Coordinator: Dr. Laurence von Kalm

Office BIO 433

Instructors: Ms. Nicole Barnette (Sections 11 and 12)

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Mr. Corey Seavey

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Mr. Michael Haney

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Office hours: Thurs 9:30am-1:30pm

All office hours in **BIO 434**

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 \*\*\***

**\*\*\*LONG PANTS OR DRESSES MUST 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.

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**\*\*\*LONG PANTS OR DRESSES MUST BE WORN IN THE LABORATORY\*\*\***

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

Lab 7 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 **ONLINE HOMEWORK 1** 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 Aug 31<sup>st</sup>. 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) Practical Exams (45% of grade)

There will be three practical exams during the semester, each worth 15% of the final grade. There may be calculations that require a calculator. **Bring a calculator for all exams.** Exams will be short answer based on information in power points, quizzes, and in class experiments. There will be 10-15 questions per exam. A time limit for each station will be imposed and you will not be allowed to return to previous stations once you have moved on. Hands on technique assessment will also be a graded part of some exams.

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

**Students cannot keep any part of the exam and all pages must be turned in for grading. Any student turning in an exam that is missing pages or who attempts to steal an exam will receive an automatic F for the entire course and face disciplinary action for student misconduct.** Exam scores will be posted on the Grades page of Webcourses. Students are strongly encouraged to review their exams with their instructor.

2) Lab Reports (28% of grade)

Two written lab reports each worth 14% 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 4-5 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.
- 3) Quizzes (total of 27% of grade) 10 quizzes will be given throughout the semester. The quizzes will be based on the previous lab experiment and lecture. Activities done during the previous lab may be included in the quiz grade. Quizzes will be short-answer format and may require calculation. **Bring a calculator to all classes.** 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 and online homework. You will be allowed to drop 1 quiz grade.

\*\*\* **Attendance:** If you arrive more than 30 minutes late, leave early or miss a lab without an acceptable documentable excuse you will receive a 0 for that lab's quiz (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.

Online homework – Online homework will review concepts covered in the power points and provide practice for calculations covered in lab. No grade will be given for this, but completion is highly encouraged.

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

## **SCHEDULE OF LABORATORY EXERCISES**

August 24<sup>th</sup>/25<sup>th</sup> – LAB 1: Principles of probability, punnet squares, Chi squared test

August 31<sup>st</sup>/September 1<sup>st</sup> – LAB 2: Polytene Chromosomes from Drosophila salivary glands

**September 7<sup>th</sup>/8<sup>th</sup> – NO CLASS – Labor Day**

September 14<sup>th</sup>/ 15<sup>th</sup> – LAB 3: Start Group Project 1 (Lab Report 1)

September 21<sup>st</sup>/22<sup>nd</sup> – LAB 4: Chromatographic characterization of Drosophila melanogaster mutants

September 28<sup>th</sup>/29<sup>th</sup> – **PRACTICAL EXAM 1**

October 5<sup>th</sup>/6<sup>th</sup> - LAB 5: Isolation of DNA

- Lab Report 1 Rough Draft Due
- Start Group Project 2

October 12<sup>th</sup>/13<sup>th</sup> – LAB 6: Population genetics: The Hardy-Weinberg principle

October 19<sup>th</sup>/20<sup>th</sup> – LAB 7: Human chromosomes and applied human genetics

- Lab Report 1 Final Draft Due

October 26<sup>th</sup>/27<sup>th</sup> – **PRACTICAL EXAM 2**

November 2<sup>nd</sup>/3<sup>rd</sup> – LAB 8: DNA Restriction enzyme digestion and polymerase chain reaction Part 1

**(November 2<sup>nd</sup> – withdrawl deadline)**

November 9<sup>th</sup>/10<sup>th</sup> – LAB 9: DNA Restriction enzyme digestion and polymerase chain reaction Part 2

November 16<sup>th</sup>/17<sup>th</sup> – LAB 10: Gene action: Synthesis of B-galactosidase in E. coli

- Lab Report 2 Rough Draft Due

November 23<sup>rd</sup>/24<sup>th</sup> –Lab Report 2 Writing Day

November 30<sup>th</sup>/December 1<sup>st</sup> – **PRACTICAL EXAM 3**

- Lab Report 2 Final Draft Due