# Genetics Laboratory – PCB 3063L

1 Credit hour


Laboratory Coordinator: Dr. Laurence von Kalm

Office BIO 433

Instructors: Mr. Tobias Nielsen (Sections 15 and 18)

Room BIO 412

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Office hours: Thursday and Friday 10AM-12PM


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

**Course website:** Access our course website at 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 model organisms.
- Write a lab report.
- Understand basic concepts in genetics such as punnet squares and the relationship between genotype/phenotype.
- Demonstrate knowledge of common lab techniques in the study of genetics: PCR, gel electrophoresis, enzyme assays, DNA extraction, and chromatography.
- Develop a hypothesis, an experimental design using common wet lab techniques, and present whether the experiment supports the hypothesis.

**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 students to build upon key genetic concepts in a hands-on manner. Additional emphasis will be given to development of hypotheses, experimental design/data analysis, and presentation of results.

**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 *****

***** PANTS OR LONG SKIRT MUST BE WORN IN THE LABORATORY *****

**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 only if all course work is completed and on time. There will be no exceptions to this policy.**

| Grade Range % | Letter Grade | GPA |
|---|---|---|
| 90 - 100 | A | 4.0 |
| 80 - 89 | B | 3.0 |
| 70 - 79 | C | 2.0 |
| 60 - 69 | D | 1.0 |
| below 60 | 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) Participation (12.5%) – This class is dependent on working together as a class to build upon prior knowledge. Class discussion and contributions are paramount to this goal. Active involvement in all experimentation and discussion is required.

2) Attendance (12.5%) – If you arrive 15 minutes late, you will receive half of the attendance grade for that lab. 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 attendance. (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 10% 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.

3) Homework (10%) – Homework assignments will be assigned after each lab. The assignments will be due at the beginning of the following lab. Homework assignments will emphasize critical thinking ability.

4) Online Quizzes (20%)
   These will be made available after each lab and will be due before the subsequent lab. Online quizzes will review vital concepts covered in the power points and provide practice for calculations covered in lab.

5) Lab Reports (30% of grade)
   Two written lab reports each worth 15% of the grade each. These lab reports will be based on experiments performed in the laboratory. Instructions for the experimental approach and written lab reports are on Webcourses. The Lab Report will be the culmination of multiple Homework assignments throughout the semester. These homework assignments 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 develop a hypothesis and experimental design to study the inheritance pattern of a single mutant eye phenotype. Each student will turn in an individual written lab report. Failure to write the lab report in your own words will result in a zero.
   b. Lab Report 2 – Groups of 4-5 students will develop a hypothesis and experimental design to study the molecular basis of a mutant phenotype. Each group will turn in a single lab report. Failure to write the lab report in your own words will result in a zero.

**Late assignments will not be accept and will result in a zero.**

6) Lab Practical (15%)

Exams will be based on information in power points, quizzes, and in class experiments. There will be 20-25 questions per exam. A time limit for each station will be imposed and you will not be allowed to return to previous stations. 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 your attendance. 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.

## SCHEDULE OF LABORATORY EXERCISES

Module 1: Introduction to science and experimental design

8/24 – LAB 1: Introduction to science

- Syllabus review
- Grades: Participation 1, Attendance 1
- HW1: Develop a hypothesis

8/31 – LAB 2: Experimental design

- Grades: Participation 2, Attendance 2, Quiz 1, HW1
- HW2: Develop an experiment

9/7- **No class. Labor Day**

Module 2: Mendelian inheritance and variations

9/14 – LAB 3: Model organisms and fly handling

- Grades: Participation 3, Attendance 3, Quiz 2, HW2

9/21 – LAB 4: Mendelian variations

- Grades: Participation 4, Attendance 4, Quiz 3, HW3

9/28 – LAB 5: Chromosomal theory of inheritance

- Grades: Participation 5, Attendance 5, Quiz 4, HW4

10/5 – LAB 6: Mendelian assay lab #1

- Grades: Participation 6, Attendance 6, Quiz 5, HW5

10/12 – LAB 7: Mendelian assay lab #2

- Grades: Participation 7, Attendance 7, Quiz 6, HW6

Module 3: Molecular genetics

10/19 – LAB 8: What we've learned, where to next, and common techniques in genetics laboratories.

- Grades: Participation 8, Attendance 8, Quiz 7, HW7

10/26 – LAB 9: Molecular assay lab #1

- Grades: Participation 9, Attendance 9, Quiz 8, HW8

11/2 – LAB 10: Molecular assay lab #2

- Grades: Participation 10, Attendance 10

Module 4: Human genetics

11/9 – LAB 11: PTC & Phenotype.

- Grades: Participation 11, Attendance 11, HW9
- **Lab Report 1 Final Draft Due**

11/16 – LAB 12: PTC & Genotype.

- Grades: Participation 12, Attendance 12, Quiz 9
- Practical Exam review

11/23 – **No class. Thanksgiving**

11/30 – Practical Exam/Lab Report 2 Final draft due.