

Syllabus Genetics Laboratory (BIOL 3411)

Spring 2010

<http://geneticslab.faywatson.com>

Instructor:

Fay Nieves Watson
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message with the secretary)

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Office Hours: Tuesdays and Wednesdays after class by appointment. If necessary, appointments can also be scheduled for other times. I can be contacted by e-mail and will usually respond within a day.

Campus Closing: Call the campus emergency line 281-283-2221 the Message is updated every 30 minutes

Section 01: BIOL 3411, Tuesday 10:00 – 12:50 pm, BAYU 3108

Section 02: BIOL 3411, Wednesday 10:00 – 12:50 pm, BAYU 3108

Corequisite: Genetics BIOL 3431

Prerequisites: One year of general biology and one semester of chemistry.

Text: *Genetics Laboratory Investigations* (13th Edition) by Thomas R. Mertens and Robert L. Hammersmith, Prentice Hall Publishing Co is **REQUIRED**. You will be using this notebook and will be removing pages from the book for grades. It is in your best interest to make copies of those pages for taking notes in the laboratory.

Course Objectives: This course is designed to provide students with a thorough laboratory experience in classical genetics, molecular genetics, and population genetics.

Learning Outcomes: After completion of this course students will be able to perform classic genetic cross experiments and analyze the data obtained, they will be introduced to basic genetic cell structures and describe the processes involved in meiosis, mitosis, and endomitosis, they will evaluate and describe pedigrees and family trees for genetic diseases, they will be able to relate to others how different genetic diseases are inherited and passed to offspring, they will learn to perform bioinformatics, molecular biology and microbiology techniques that apply to genetics and establish relationships between subjects or samples and restate the results into a coherent discussion. Students will also be expected to perform population genetics experiments, analyze that data and report the data obtained. At the end of the course all students will know basic genetic lab techniques and will be able to reproduce the experiments listed at the end of the syllabi.

Testing and Grading: The final exam will be based on class lectures and text information. In order to do well in this course, the assigned reading must be read before class and a pre-lab writeup done, with the day's lab procedure outlined. Grades will be based on the final exam grade, your prelab writeups and lab results that you turn in for each lab.

Drop Date: April 1, 2010

UHCL Honesty Policy

The Academic Honesty Policy at UHCL <http://www.uhcl.edu/catalog/06.Gen.Pro Req.06.07.html> states:

"Academic honesty is the cornerstone of the academic integrity of the university. It is the foundation upon which the student builds personal integrity and establishes a standard of personal behavior."

The Honesty Code of UHCL states:

"I will be honest in all my academic activities and will not tolerate dishonesty."

Because honesty and integrity are such important factors, you should be aware that failure to perform within the bounds of these ethical standards is sufficient grounds to receive a grade of "F" in this course and be recommended for suspension from UHCL.

and 6 drop RULE

6 Drop Rule Limitation - Students who entered college for the first time in Fall 2007 or later should be aware of the course drop limitation imposed by the Texas Legislature. Dropping this or any other course between the first day of class and the census date for the semester/session does not affect your 6 drop rule count. Dropping a course between the census date and the last day to drop a class for the semester/session will count as one of your 6 permitted drops. You should take this into consideration before dropping this or any other course. Visit www.uhcl.edu/records for more information on the 6 drop rule and the census date information for the semester/session.

<u>Grades:</u>	LAB ASSIGNMENTS	50 %
	QUIZZES	15%
	PRE-LAB WRITE UPs and Participation	25%
	FINAL EXAM	10%
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	Total =	100 %

Grading

<u>Scale:</u>	A	92-100%	B-	78-79%	D+	63-64%
	A-	89-91%	C+	75-77%	D	58-62%
	B+	86-88%	C	68-74%	D-	55-57%
	B	80-85%	C-	65-67%	F	< 54%

Testable Material: At the beginning of each lab exercise there is an introduction, you are responsible for reading the entire lab before coming to class. You must do a pre-lab write-up. You will be responsible for any introductory material presented by the instructor as well. There will be at least 5 quizzes given randomly throughout the semester. It is to your advantage to keep up your lab work.

Test /QUIZ/ Exam Rules The following rules will be followed during tests/quizzes:

- 1) Keep your eyes on your own quiz/test. If I catch you looking at someone else's test, I will warn you first with a cold stare and second vocally. **The third time I will take up your test and give you a Zero!!!!!!**
- 2) All cell phones will be turned off and put away. **DO NOT ANSWER OR USE YOUR PHONE!!!!!!** Tell your family and friends that you will not be allowed to use your phone during test time. This has unfortunately become away to cheat and will not be tolerated in my

classroom.

- 3) You will need a **regular, classic calculator** when taking an exam. Do not use Dictionary/translator-type PCs, pocket-type PCs, or any calculators that allows you to type in text. I have extra calculators if needed.

CLASS Participation and Pre-Lab Writeups:

Each student is expected to **attend** and **participate** in the lab exercise every week. This includes keeping the lab clean and tidy. Some of the lab exercises will require that the students come in at other times during the week to take care of their experiment. You are required to prepare a **pre-lab write-up** before every lab period. You must arrive on time to class and present the pre-lab write up when you arrive for the lab period. This write up will be in the form of an outline of the materials and lab procedure/method of the exercise(s) to be done that day. Record this pre-lab write-up in a composition notebook. These two components comprise 25% of your grade.

Lab Assignment Grade

Lab assignment grades (50% of your grade): you will be required to turn in lab assignments at the beginning of the lab period that they are due (typically two weeks after completion), except the last lab report which will be turned in the day of the final. In the past, each period that the lab is turned in late resulted in a 10% drop in this grade. Check the assignment list at the back of this syllabus for dates (these may change as availability of supplies requires).

Other

Questions:

Some of the questions on the quizzes/final will be calculations for making chemical solutions and using the metric system. If you are going to study science and work in this field, there are certain mathematical skills you will have to have. The following mathematical problems, which are basic to biology, will be addressed:

- 1) Making dilutions using the $V_1C_1 = V_2C_2$ formula.
- 2) Generating a certain volume of a solution with a specific molarity using the molecular weight or how to make a percent solution (see #5).
- 3) Generating complex solutions using stock solutions. You should be able to make a 250 ml solution of 100 mM Tris-HCL, 50 mM NaCl, 0.1% SDS and 1 mM EDTA using the following stock solutions: 1 M Tris-HCl, 5 M NaCl, 10% SDS, 0.5 M EDTA and then bringing it up 250 ml with water.
- 4) Understanding and using the metric system for measuring length (meters), weight (grams) and volume (liters). You should be able, for example, to convert nanometers into meters.
- 5) **Remember this relationship between meters, grams and liters:**
At room temperature and 1 atmosphere of pressure =>>
One milliliter of water = One gram of water = One cubic centimeter of water. How does one cubic millimeter fit in this relationship? How can this be used to make a 10% solution of a particular powdered compound, e.g., SDS?

Make-Up Exam and Switching Sections:

Make-up for the final exam is not available.

Switching sections is only allowed with prior permission from both instructors; please contact me at least 24 hours in advance through email or by phoning the suite secretary Maria Winters who will contact me and the other lab instructor.

Week #	Date	Turn in lab #(s)	Investigation #	Laboratory Topics
1	1/19		1 and Pipetting Handout	Introduction and Orientation to the genetics lab <i>Drosophila</i> and Maize Experiments in Genetics: Monohybrid and Dihybrid crosses
2	1/26		2 & 4	Principles of Probability Finish the probability lab Cell Reproduction: Mitosis
3	2/2	1	HANDOUT and 26	Genetic Material: Isolation of DNA and NCBI and Genomic Data Mining
4	2/9	2 and 4	15 & 26	Restriction Endonuclease Digestion, Gel Electrophoresis, and analysis used to Map Restriction Fragments NCBI and Genomic Data Mining
5	2/16	DNA Handout	17	Transformation of <i>E.coli</i>
6	2/23	15 & 26	7 & 8	Polytene Chromosomes from <i>Drosophila</i> Salivary Glands Sex Chromosomes and Gene Transmission
7	3/2	17	3 & 5	Chi Square Test Meiosis in Animals: Oogenesis and Spermatogenesis
8	3/9	7 & 8	9 & 10	The Sex Check: A study of Sex Chromatin in Human Cells and Human Chromosomes
March 15-19, 2010 Spring Break April 1, 2010 is the last day to drop / withdraw from classes				
9	3/23	3 & 5	12&19	Genetics of Ascospores Color in <i>Sordoria</i> an Investigation of Linkage and Crossing Over using Tetrad Analysis Chromatographic Characterization of <i>Drosophila melangogaster</i> Mutants
10	3/30	9 & 10	PCR Handout	Human VNTR Polymorphism AT – 2 grades for this lab
11	4/6	12&19	PCR gel analysis	TA will run samples on a gel, students will evaluate their samples and answer the questions
12	4/13		Plaques	Working with Bacteriophages
13	4/20	PCR	22 & 23	Polygenic inheritance: Fingerprint Ridge Count Population Genetics: The Hardy Weinberg Principle
14	4/27	Plaques	24 & 25	Part II only – Genetic Drift and Fixation of an allele Applied Human Genetics
16	5/4	22 & 23 24 & 25	Final EXAM	Turn in the last lab reports