

General Genetics

Laboratory Sections 2 & 3

Biology 184 — Fall 2012

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I. Laboratory Class times

Section 2: M/W 9:00 -10:15 PM (HUM-220)
Section 3: M/W 10:30-11:45 PM (HUM-220)

II. Course Prerequisites:

All students need to show proof of having passed BIO 1, 2, and Chem 1A (or equivalent at other institutions) by the end of the first week of classes.

III. Books

Laboratory

Bio 184 Laboratory Manual (Fall 2012) Ballard, R., B. Holland, T. Peavy and M. Loo.
Available at the Hornet Bookstore. Need it during the first week of laboratory since we begin experiment 1 on the second day of class.

IV. Course Objectives: *The overall course objective is to increase student knowledge, awareness and appreciation of classical and molecular genetics with emphasis on the formation, transmission, function and organization of the genetic material.*

Learning Outcomes in the Laboratory: Specifically you will be able to...

1. Perform hands-on laboratory skills related to genetics such as gel electrophoresis, DNA manipulation, microscopy, forensics, gene mapping, enzyme assays, and spectrophotometry.
2. Analyze and interpret the data collected in the laboratory experiments
3. Communicate and present on a topic related to genetics
4. Identify and discuss controversial and ethical issues related to genetics
5. Graph data in excel software

V. Course Structure:

The **lecture** portion of the class will be worth 2/3rd of the total grade and will provide students with the conceptual framework of genetics and develop problem-solving skills. The **laboratory** portion of the class will contribute 1/3rd to the total grade points and will be a combination of learn-by-doing exercises (illustrating central themes of genetics), five lab practical quizzes (testing comprehension of the laboratory exercises) and student presentations on current genetics-related topics (enhancing student appreciation for the complex issues surrounding genetic technologies). Laboratory materials and grades will be available within **SacCT 9.1** (<http://www.csus.edu/sacct/>).

VI. Laboratory Evaluation:

A. Lab Participation & Preparation	15 pts
B. Lab Practical Quizzes (5 @ 25 pts)	125 pts
C. Student Presentation	40 pts
Total Laboratory Points	180 pts

NOTE: Final grades will be determined by the lecture instructor (which happens to be me!)

A. Lab Participation & Preparation

In order to participate, a student must attend the labs. Students that **miss more than three unexcused laboratory sessions will receive a "WU" in the course** (equivalent to an "F" since student failed to complete course requirements) or your final grade will be reduced by one letter, at the instructor's discretion. Points for lab participation will be divided between attendance, preparedness for lab, effort in lab, and participation in discussions. As for preparedness, you will be required to turn in an outline of each of the 5 laboratory exercises on the first day that any lab exercise is held (to be included: purpose of experiment; outline of each day's activities/protocol). Students can make up labs by attending the same laboratory session taught by the other genetics instructors if can be arranged.

B. Lab Practical Quizzes

Lab practical quizzes are designed to test student comprehension of the laboratory exercises. Questions are based on the laboratory exercises leading up to the quiz and therefore are not cumulative. Questions may be presented at laboratory stations where students rotate through the stations. Make-up quizzes will only be accommodated for individuals if their circumstances surrounding their absence was beyond their control as deemed by myself (e.g. medical emergency). Written documentation will be required.

C. Student Presentations/ Service Learning

Student Presentations

Students are to perform library research on a current topic in the field of genetics and present their findings orally in a PowerPoint presentation (approximately 7-8 minute presentation; 2-3 minute question period). Students should include enough background information for their peers to be able to understand the topic. In addition, the student is to hand-in a **½ to 1 page summary** of the topic to the instructor (with their name and title of presentation) that includes their **references** (need to be complete citations to receive full credit and 1 citation must be peer reviewed).

VII. Course policies

Cheating and plagiarism are not allowed. Cheating and plagiarism are very serious offences and will be prosecuted accordingly. The Department Chair and Dean of Students will be notified of the event and the student may be dismissed from the course with an "F". Other possible lesser actions may be the loss of all points for the assignment/quiz and/or reduction of the students final grade. All quizzes are closed book and notes. Plagiarism is defined by the University as **"the use of distinctive ideas or works belonging to another person without providing adequate acknowledgement of that person's contribution."** Students should review the University policy on plagiarism provided on the web (<http://www.csus.edu/facs/about%20us/plagiarism.html>).

VIII. Add/Drop Policy

All adds will be done by the BIO 184 lab instructors since the limitation is 16 students per laboratory. If you are given permission to add, make sure you drop any conflicting classes you are enrolled in otherwise you will not be added.

As for drops, students should first evaluate whether they have the time to devote to the class prior to enrolling in the class. But in the case a student needs to drop, they may do so online within the first 2 weeks of class.

During weeks 3-4, students may drop the course by petition on and no notation will appear on the student's record.

During weeks 5-6, students may no longer simply drop the course but rather need to withdraw from the course resulting in a "W" appearing on the student record.

During weeks 7-12, students may only withdraw from the course for a "serious and compelling reason". A petition must be filed and supporting documentation must be provided.

During weeks 13-15, a withdraw is only permitted in cases of an accident or serious illness and a petition is again required.

Incomplete grade: Students who are unable to meet the BIO 184 course requirements before the end of the semester may petition to be assigned an Incomplete "I" grade. Students can only receive an "I" grade if they have completed the majority of the required coursework in the class and they do not have a passing grade in the class at the time the "I" is requested. This is reserved for extenuating circumstances such as illness or the such that prevented the student from finishing the course. In this case, if the instructor approves the "I" request, conditions will be placed by the instructor for completing the course but the time frame can't exceed one year. If the student does not complete the required work in the specified time, then the "I" grade will be converted to an "F".

IX. Disabilities

Assistance will be provided to all individuals with a disability that affects their ability to succeed in the course. Students with disabilities should contact me as soon as possible (preferably in the first week) to arrange for reasonable accommodations.

X. Common Sense Rules

- A. All pagers and phones should be turned off (or set to vibrate) during class time. I reserve the option of confiscating the phone or pager from a student until the end of class if it becomes a problem.
- B. NO TEXTING during class!!!
- C. Do not talk during class or interrupt other students asking questions. When asking questions, please raise your hand to be acknowledged.
- D. If a student arrives late or needs to leave early, take a seat near the door to avoid disrupting the class.
- E. When communicating through email, please remember this is a professional correspondence. Do not treat it as a text and do not be rude.

LABORATORY SCHEDULE (Subject to change)

DATES	LAB EXERCISE	LAB MANUAL
27-Aug	Course orientation and Lab safety	
29-Aug	Experiment 1, Day One: Introduction to recombinant DNA technology	1-7
3-Sept	LABOR DAY HOLIDAY (NO CLASS)	
5-Sept	Experiment 1, Day Two: Transformation of recombinant DNA into host bacteria	7-9
10-Sept	Experiment 1, Day Three: Extraction of recombinant plasmids from transformants	9-11
12-Sept	Experiment 1, Day Four: Restriction enzyme analysis and electrophoresis	11-14
17-Sept	Experiment 1, Day Five: Analysis of agarose gels	14-17
19-Sept	LAB PRACTICAL QUIZ 1; Oral Presentation Demonstration by Instructor	18-32
24-Sept	Experiment 2, Day One: Introduction to human DNA identification;	18-32
26-Sept	Experiment 2, Day Two: Isolation of cheek cell DNA	32-35
1-Oct	Experiment 2, Day Three: Set up PCR reactions	35-37
3-Oct	Experiment 2, Day Four: Analysis of CGE run and profiling results	37-40
8-Oct	Student Oral Presentations Group 1; LAB PRACTICAL QUIZ 2	
10-Oct	Experiment 3, Day One: Enzyme induction	41-43
15-Oct	Experiment 3, Day Two: Enzyme assay	43-48
17-Oct	Experiment 4, Day One: Karyotyping protocols and applications	49-57
22-Oct	Experiment 4, Day Two: Human karyotyping	57-59
24-Oct	Experiment 4, Day Three: Karyotype case studies	60
29-Oct	Student Oral Presentations Group 2; LAB PRACTICAL QUIZ 3	
31-Oct	Experiment 5, Day One: <i>Drosophila</i> genetics and recombination	61-68
5-Nov	Experiment 5, Day Two: Probability	68-71
7-Nov	Experiment 5, Day Three: Chi-Square analysis	71-77
12-Nov	VETERAN'S DAY (NO CLASS)	
14-Nov	Experiment 5, Day Five: Handling <i>Drosophila</i> , identifying mutants, and scoring flies	77-81
19-Nov	Experiment 5, Day Six: Discussion of results	82-83
21-Nov	Student Oral Present Group 3; LAB PRACTICAL QUIZ 4	
26-Nov	Experiment 6, Day One: Introduction to heritability and regression;	84-90
28-Nov	Experiment 6, Day Two: Measuring narrow sense heritability	90-94
3-Dec	Experiment 6, Day Three: Discussion of results	94-95
5-Dec	Student Oral Presentations Group 4; LAB PRACTICAL QUIZ 5	