

University of Tennessee at Chattanooga

Biology 326: Genetics Laboratory

FALL 2005

TH 1:40-3:30

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Introduction:

The purpose of this course is to introduce students to modern genetics and the methods of genetic analysis. *Genetics* deals with the transfer, structure, and function of genetic material. In doing so genetics draws heavily upon a variety of fields including probability and statistics, cell biology, microbiology, ecology, botany, developmental biology, and biochemistry. *Genetics* is therefore an integrative science, incorporating a diverse range of scientific and mathematical disciplines.

Genetics is typically divided into three broad and overlapping areas of study, classical transmission genetics, population and evolutionary genetics, and molecular genetics. Because most genetic phenomena cannot be understood simply by direct observation, all genetic sub-disciplines rely heavily upon data analysis and conceptual problem-solving skills. Thus, although acquiring a certain degree of factual information is essential for studying genetics, developing an ability to analyze data and draw logical inferences is of paramount importance.

Course Objectives:

The overall objective of this course is to give students an appreciation of the methods and techniques used by biologist to study, analyze and interpret genetic phenomena.

Lab Notebook:

You are responsible for turning in a laboratory notebook that documents the experiments performed in the laboratory. For each laboratory exercise you should include:

- (1) An objective statement (There may be more than one objective per experiment)
- (2) Several sentences summarizing materials and methods (you can write a brief description and then state that procedures were carried out as described in laboratory manual, and then reference the manual).
- (3) A presentation of all your results and analysis
- (4) A brief conclusion
- (5) Answers to all questions/problems posed in exercise

PRIOR TO EVERY LAB, YOU SHOULD HAVE READ THE APPROPRIATE SECTION IN THE MANUAL AND ENTERED AN OBJECTIVE STATEMENT AND SUMMARY OF MATERIALS AND METHODS (POINTS #1 AND #2) IN YOUR LAB NOTEBOOK. THIS IS PART OF YOUR GRADE....I WILL CHECK ALL NOTEBOOKS PRIOR TO EACH LAB LECTURE FOR THIS INFORMATION. IF THIS ENTRY IS NOT IN YOUR NOTEBOOK, YOU WILL AUTOMATICALLY LOSE TWO POINTS FOR LAB PERFORMANCE.

YOU SHOULD HAVE A LABORATORY ENTRY FOR EACH EXERCISE, EVEN THOSE THAT YOU WRITE A FORMAL REPORT ON (SEE BELOW).

Formal Laboratory Reports:

You will be required to write a complete laboratory report for three of the exercises: the *Drosophila* exercise, the Conjugation exercise and the pGLO transformation exercise. **THESE ARE TO BE TYPE WRITTEN AND PROFESSIONAL IN APPEARANCE AND CONTENT.**

Tentative grading scheme:

The grade for laboratory work will be assessed as follows:

Drosophila exercise laboratory report (individual), 50 points

Drosophila exercise laboratory **group** journal*, 20 points

Lab notebook, 70 points

Conjugation exercise laboratory report, 20 points

pGLO Transformation exercise laboratory report, 20 points

Laboratory exam I, 100 points

Laboratory exam II, 100 points

Laboratory attendance/performance** 20 points

400 points

*Entries should be made in the Drosophila laboratory group journal every time you check on flies and carry out some part of the experiment. For each entry you should include the date and sign your name. The instructor will periodically look through the journals and evaluate individual participation in the progress of the Drosophila exercises.

The laboratory attendance/performance grade will be based on my evaluation of your performance in lab. You will be evaluated on your participation in scheduled lab sessions, your ability to interact and cooperate with your lab partners, your participation in group discussions, and your adherence to lab safety and clean-up rules. **Attendance is mandatory! Each day of lab missed automatically results in a 2 point deduction.

Grading

90%-100%	= A	(360-400 pts)
80%-89%	= B	(320-359 pts)
70%-79%	= C	(280-319 pts)
60%-69%	= D	(240-279 pts)
<60%	= F	(<240 pts)

Important Dates

- October 13, Lab Notebook #1 is due
- October 13, Laboratory Mid-term Exam
- October 27, Lab report of Conjugation Exercises I-IV is due
- November 3, Lab report of pGLO Genetic Transformation is due
- December 1, Lab Notebook #2 is due
- December 1, Laboratory Final
- Monday, December 5, by 4:00 p.m.: Drosophila Formal Report is due

University Policies and Procedures.

Please refer to the Student Handbook for policies on topics such as the honor system. If you have a disability which may require special assistance or accommodations, or you have questions related to any accommodations for testing, note takers, readers, etc., please speak with me as soon as possible.

Students may also contact the CAP/OSD Office (755-4006) with questions about services offered to UTC students with qualified disabilities.

The syllabus is tentative, and subject to change.

TENATIVE SCHEDULE

Date	Topic
Thursday, August 25	Introduction, Safety, Aseptic Technique and Handling Pipetmen
Thursday, September 1	<ul style="list-style-type: none"> • Monohybrid cross using <i>Drosophila melanogaster</i> • Yeast Exercise I: Mating; observation of zygotes
Thursday, September 8	<ul style="list-style-type: none"> • Yeast Exercise II: Detecting mating by genetic complementation • Population Genetics I: Detection of <i>AluI</i> sequence polymorphisms by PCR
Thursday, September 15	<ul style="list-style-type: none"> • Yeast Exercise III: Sporulation and observing asci (Part I) • Population Genetics II: Determining Allele Frequency
Thursday, September 22	<ul style="list-style-type: none"> • Yeast Exercise III: Sporulation and observing asci (Part II) • Conjugation Exercise I: Confirmation of bacterial phenotypes
Thursday, September 29	<ul style="list-style-type: none"> • Yeast Exercise IV: Genetic analysis of ascospores • Conjugation Exercise II: Observing confirmation plates and preparation of mating plates
Thursday, October 6	<ul style="list-style-type: none"> • Conjugation Exercise III: Testing the phenotype of the recombinants
Thursday, October 13	<ul style="list-style-type: none"> • Lab Exam I
Thursday, October 20	<ul style="list-style-type: none"> • Genetic Transformation of <i>E. coli</i> with pGLO
OCTOBER 24-25, FALL BREAK	
Thursday, October 27	<ul style="list-style-type: none"> • Cloning I: pGLO plasmid isolation and Restriction Digestion
Thursday, November 3	<ul style="list-style-type: none"> • Cloning II: Gel purification of GFP gene and ligation into pUC19

Thursday, November 10	<ul style="list-style-type: none"> Restriction Mapping I: pUCGFP plasmid isolation and restriction digestion
Thursday, November 17	<ul style="list-style-type: none"> Restriction Mapping II: DNA electrophoresis and visualization of fragment migration patterns
	November 23, 24, 25 Thanksgiving Holiday
Thursday, December 1	<ul style="list-style-type: none"> Lab Final
	No More Classes!!!