

Biology 224: Techniques in Molecular Biology

Spring, 2010

INSTRUCTORS: Thursday AM section: Dr. Judy Levin, HS 222
Phone: 410-337-6525
Email: jlevin@goucher.edu

Tuesday / Thursday PM sections: Jackie Andrews, HS G83
Phone: 410-337-6304
Email: jandrews@goucher.edu

TEXT: McMillan, V.F. (1998 or later edition) *Writing Papers in the Biological Sciences*, St. Martin's Press, New York.
(This text was required for Introductory Biology)

COURSE GRADING:

The grade is based upon evaluation of written lab reports and assignments, a lab exam and student performance in lab. *This course must be successfully completed to receive writing proficiency in the Biological Sciences major. Students who fail to achieve writing proficiency in this course **will be required** to take an additional writing course if continuing in the major.*

Grade breakdown is as follows:

<u>Lab Reports</u>	160 points
Report 1 – Restriction Mapping of pATC57 (50 points)	
Report 2 – Patterns of Inheritance in <i>D. melanogaster</i> (50 points)	
Report 3 – Genetic Analysis of Yeast Auxotrophic Mutants (60 points)	
<u>Lab Performance</u>	40 points
Pipetting Exercise (5 points)	
Calculations (5 points)	
Restriction Mapping Problems (5 pts)	
Sordaria Exercise (5 points)	
Population Genetics Exercise (5 points)	
PCR Exercise (5 points)	
Phage Recombination Exercise (5 points)	
Effort (5 points)	
Total possible points:	200 points

LAB REPORTS:

In this course, you will be graded primarily on the quality of your lab reports. Acceptable writing in this course is necessary to receive writing proficiency in the Biological Sciences major. Should you NOT receive writing proficiency in this course, you will be required to take a technical writing course through the English department to continue the Biological Sciences major.

Unless an extension is granted by the instructor, late reports will be penalized one letter grade for each day that they are turned in after the deadline!

Appendix B of this manual outlines the basic format for lab reports in this class; it is identical to the format used in most Biological Sciences courses at Goucher College. For this course, additional information regarding the specific content of each report will be given to assist you in the preparation of your report.

Note that only primary data may be shared among members of the lab group. Each individual is expected to interpret the data and complete the write-up independently.

LAB NOTEBOOKS:

In the laboratory, students will generally work in pairs. Some lab exercises will be carried out over the course of several weeks and students often find it desirable to divide lab duties. However, each individual will be responsible for securing all experimental data and for understanding the general concepts and techniques employed throughout the entire experiment.

All data and observations are to be recorded in a laboratory notebook. As you know from Cell Biology, the care with which you maintain your laboratory notebook is directly related to the ease with which you recall information for your lab reports or lab exam! The instructor may occasionally collect lab notebooks (unannounced) in order to ensure that the student is keeping the notebook up to date. The quality of the notebooks may be used to evaluate the individual student's lab performance during the semester.

LAB PERFORMANCE / ATTENDANCE POLICY:

Students are expected to arrive in class **on time** and to have completely read the lab exercises before coming to class. Students must attend **all** laboratories. Excused absences will require a written medical excuse OR prior approval of the instructor. This laboratory course is taught TUES PM and THURS AM and PM. Every effort will be made to accommodate a student in another lab section if 1) advanced notice is provided and 2) the student has a legitimate reason to be absent from lab. ***For each unexcused absence from lab, the student will be penalized 10 points (5%) of the total course grade (200 points).***

LABORATORY PROFICIENCY EXAM:

Students intending to major in the Biological Sciences are required to take a laboratory proficiency exam upon completion of this course. This written exam will evaluate students on

basic laboratory skills such as reading pipetmen correctly, constructing and using standard curves, basic laboratory calculations, making solutions, etc. This exam is primarily a review of material that should have been mastered in the Cells and Genetics laboratories. Students must pass this exam with a score of 70% or better to take a 300-level biological sciences course. If a student does not pass, review materials and tutoring will be provided by the department as necessary.

Techniques in Molecular Biology

Laboratory Schedule – Spring, 2010

Week	Date	Laboratory	Assignment
1	Jan 26 & 28	Pipetting Exercise	Pipetting exercise due Feb 2 / 4
2	Feb 2 & 4	Determination of the patterns of inheritance for selected genes in <i>D. melanogaster</i> (<i>Drosophila</i>), part one: Begin P1 crosses	<i>Drosophila</i> lab report due April 3 Sample calculations due Feb 9 / 11
3	9 & 11	Restriction mapping of pATC57 (<i>Mapping</i>), part one: Transformation of competent cells <i>Drosophila</i> , part two: remove P1 flies	<i>Mapping</i> lab report due March 9 / 11
4	16 & 18	<i>Mapping</i> , part two: Miniprep of plasmid DNA and restriction digest <i>Drosophila</i> : check hatchings	Restriction mapping problem set due Feb 23 / 25
5	23 & 25	<i>Mapping</i> , part three: Agarose gel electrophoresis of DNA fragments <i>Drosophila</i> , part three: Count F1 flies; set up matings	
6	Mar 2 & 4	Tetrad analysis of <i>Sordaria fimicola</i> <i>Drosophila</i> : check hatchings	<i>Sordaria</i> exercise due at the end of class
7	9 & 11	<i>Drosophila</i> , part four: Count F2; data analysis	<i>Mapping lab</i>

			report due
8	16 & 18	SPRING BREAK – NO CLASSES!	
9	23 & 25	Genetic analysis of <i>S. cerevisiae</i> auxotrophs (<i>Yeast</i>), part 1: Phenotypic characterization of mutant and wild-type strains	<i>Yeast</i> lab report due April 20 / 22
10	Mar 30 & Apr 1	<i>Yeast</i> , part two: Phenotypic characterization and genotypic determination of mutant strains	<i>Drosophila</i> lab report due Apr 2
11	6 & 8	Population genetics <i>Yeast</i> , part three: Result collection	Population exercise due Apr 13 / 15
12	13 & 15	Polymerase chain reaction (<i>PCR</i>), part one: Amplification of cheek-cell DNA to detect the Alu sequence at the PV92 locus	PCR exercise due Apr 27 / 29
13	20 & 22	PCR, part two: Agarose gel electrophoresis of PCR products Phage recombination, part one	<i>Yeast</i> lab report due
14	27 & 29	Phage recombination, part two Course evaluations	Phage exercise due at the end of class
14	4 & 6	Free/ Make-up date	

There will be a final exam period scheduled for this class, which will evaluate laboratory proficiency in the Biological Sciences. Student performance on this exam will NOT be factored into Biology 224 grades.

