BIOL 2355: Honors Genetics Laboratory
Fall 2011 Syllabus

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Course Description:
This course is designed for exceptional students interested in learning important concepts and practical techniques in the field of genetics. This lab is project-based, where students will design and conduct a laboratory experiment aimed at exploring aspects of transmission genetics, population genetics, and molecular genetics using the model organism *Escherichia coli*. We will cover necessary *E. coli* culturing techniques and some general genetics techniques in the first half of the semester. We will explore relevant published literature and hone scientific writing skills in lab notebooks and when constructing lab reports. While this laboratory is the companion to BIOL 2354, your grade in each course is independently earned. This course is 1.0 credit hour. You are expected to work for 3 full hours in lab each week, and for the additional time required to complete your lab prep and assignments.

Course Goals: By the end of this course, you will be able to:

1) Generate genetics hypotheses using a haploid microbial model.
2) Design experiments and interpret their results using basic statistical analysis.
3) Create and troubleshoot genetics lab protocols.
4) Write notebooks and lab reports in the style accepted by genetics scientific journals.
5) Use appropriate lab safety standards and precautions.

Required Textbooks and materials:

Text:	Griffiths et al. Introduction to Genetic Analysis. 10th edition (same as for lecture)
Lab Manual:	Honors Genetics Lab Manual Fall 2011, available only at Tech Bookstore (B&N)
Notebook:	Three-ring binder
Safety:	Lab coat (see 'Lab Safety' for details)
Other:	Close-toed shoes and long pants are required for every lab; calculators and laptops (one per group) are useful (you will not be allowed to use your cell phone in lab, even as a calculator)

Attendance: 100% attendance is expected. You will work with others to perform experiments and collect data, so there will be no make-up laboratories. If you must miss a laboratory, contact Dr. Spencer as soon as possible—beforehand is helpful. Vacation, work commitments, and social events are not acceptable reasons to miss lab. Examples of legitimate reasons to miss a lab include serious illness, illness or death in your immediate family, and participation in official university activities. You will be required to provide documentation for excused absences. You will not be permitted to make up work for unexcused absences. Persistent tardiness may result in loss of points from your participation grade.

Evaluation: Your grade will be calculated out of 300 points using the following scale:

A: ≥ 90.0%
B: ≥ 80.0% and < 90.0%
C: ≥ 70.0% and < 80.0%
D: ≥ 60.0% and < 70.0%
F: < 60.0%

Points will be based on the following:

Pre-Lab Quizzes (5–10)	10%
Discussion	5%
Lab Notebooks	20%
Lab Reports (3)	50%
Project Presentation	10%
Performance	5%

Lab Notebooks: Your lab notebook should contain neat, organized, and detailed notes each week. Your notebook must include an introduction to each lab, detailed explanations of the methods you used, reasons for conducting particular methods, results of experiments you complete, explanation of analyses, and summaries of conclusions. Lab notebooks will be collected for grading in weeks 5, 10, and 15. Your notebook will be graded on content, legibility, and thoroughness. A thorough lab notebook will be critical to write accurate lab reports. In your notebook, you must write in your own words, even if you are working with a partner or group on the experiment. The only exception to this is tables that contain experimental data, which one member of your group can record initially and others can then copy into their own notebooks. Proofread all data carefully. See T-square for a lab notebook rubric.

Quizzes: T-square quizzes will be taken prior to lab in some weeks. Quizzes will be announced on Monday and are due Wednesdays by 11:55 pm. They will concentrate on the next day's material and/or your progress to date on your project. Late submissions will not be accepted. If you miss a quiz due to an unexcused absence from lab, you will receive a zero for that quiz. Each quiz is weighted equally.

Reports: All lab reports are individual assignments. While lab work is done collaboratively, every component of the lab report, including tables and figures, should be generated by the report's author. Reports must be submitted electronically on the T-square "Assignments" menu. Lab reports are due at the beginning of lab on the dates indicated. An exact schedule of assignments and due dates is shown below in the schedule. Assignments are due at the date and time specified. A late assignment will be reduced one letter grade (10%) for each day it is late.

Lab Safety: Georgia Tech has recently revised its policy regarding appropriate clothing in laboratories where chemicals and organisms are used or manipulated. Students not conforming with the following rquirements will be asked to leave the lab to acquire appropriate clothing:

1. **Long pants** must be worn in the laboratory.
2. **Close-toed shoes** that cover the sides and top of the foot must be worn in the laboratory.
3. **Lab coats** must be worn when working at the bench. Students are responsible for keeping their lab coats in good condition and reasonably clean so as to not create a hazard. Lab coats must be 100% cotton and cover the wearer to the knees.
4. **Safety glasses** must be worn when working at the bench. Safety glasses must have side shields for splash protection and conform to the wearer's face. Glasses must be worn over prescription glasses and contact lenses. Safety glasses will be available for your use in the lab.

Students can purchase appropriate lab coats at the VWR store in the Ford EST Building. More complete laboratory safety policies for Genetics Lab will be discussed on the first day of lab.

Academic Integrity: Academic dishonesty will not be tolerated. This includes cheating, lying about course matters, plagiarism, stealing classroom materials, or helping others commit a violation of the Honor Code. Students are reminded of the obligations and expectations associated with the Georgia Tech Academic Honor Code and Student Code of Conduct, available online at www.honor.gatech.edu. While students will collaborate in performing the experiments and collecting the data, each student is expected to write his or her own lab reports, including creating his or her own tables and figures. Plagiarism includes reprinting the words of others without both the use of quotation marks and citation. As direct quotes are seldom used in scientific writing, you are expected to rephrase the words of others and provide the citation. If this is unclear, please ask your TA for help before turning in your assignment.

Learning Accommodations: If needed, we will make classroom accommodations for students with disabilities. These accommodations must be arranged in advance and in accordance with the ADAPTS office (http://www.adapts.gatech.edu).

Tentative Schedule--This schedule is subject to revision.

Week	Date	Topic	Assessment Due (in lab)
1	*25-Aug*	*No lab*	*NONE*
2	1-Sep	Overview and Lab Safety	Read assigned background paper
3	8-Sep	Lab 2: Characterizing E coli B strains	Read Spencer et al. 2007
4	15-Sep	Lab 3: Fast-switchers and slow-switchers: Phenotype to Genotype	*NONE--lecture exam*
5	22-Sep	Lab 4: PCR for genetic variation in the acetate operon	Read Le Gac et al 2008 Strain Characterization Lab report due Notebooks collected
6	29-Sep	Lab 4 continued: Electrophoresis and data analysis	*Initial project proposal due*
7	6-Oct	Lab 5: Plasmids and insert expression	*Revised project proposal due*
8	13-Oct	Project lab day1	*NONE--lecture exam*
9	20-Oct	Project lab day2	Plasmid lab report due
10	27-Oct	Project lab day3	Notebooks collected
11	3-Nov	Project lab day4	
12	10-Nov	Project lab day5	
13	17-Nov	Project Presentations	*NONE--lecture exam*
14	*24-Nov*	*Thanksgiving Holiday*	
15	1-Dec	Lab clean-up and wrap-up	Project lab report due Notebooks collected
16	*8-Dec*	*No lab*	Notebooks available for pick up