Syllabus: BIOL 2355 Honors Genetics Laboratory, Fall 2012

Instructor:
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Clough Commons 474D  
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303 Cherry Emerson Building  
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Honors Genetics lab Teaching Assistants are graduate students with expertise in genetics research. They are available during office hours and by appointment for up to 2 hours/week outside of class to work with you on material connected to this lab course, including hypothesis generation, experimental design, technical expertise, and science writing. Please respect their other work and research commitments by using their time effectively when you consult with them.

Classroom: CE 123 (wet lab) and CE 206 (computer lab). See schedule.

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 co-required 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 2012, available only at Tech Bookstore (B&N)
Notebook: You may take notes during lab in any format you find convenient. Your formal lab notebook will be maintained electronically for this course.
Safety: Lab coat (see ‘Lab Safety’ for details)
Other: Close-toed shoes and long pants are required for every lab held in CE123 (wet labs); 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 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) 45%
- Project Presentation 10%
- Groupwork evaluation 10%

Quizzes: T-square quizzes will be taken prior to lab in some weeks. Quizzes will be announced by email on Monday and are due Wednesdays by noon. They will concentrate on that week’s lab material and/or your progress to date on your project. Late submissions will be flagged for penalty; submissions will not be accepted after the beginning of the lab period. 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. Upon on-line submission, you should receive a T-square submission email; please save this as evidence in case of submission error.

Lab e-Notebooks: Your lab notebook should contain neat, organized, and detailed notes each week. Your e-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 e-notebooks will be monitored and commented on regularly, and graded periodically. Your notebook will be graded on content, accuracy, and completeness according to the rubric in the lab manual. A thorough lab notebook will be critical to write accurate lab reports. In your notebook, you must write in your own words and create your
own tables and figures, even if you are working with a partner or group on the experiment. Proofread all data carefully.

**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 as a paper copy in lab and 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 24 hour period that it is late.

For e-notebooks and reports, you may want or need to set up an appointment for interactive writing assistance from tutors in the Communication Center (www.communicationcenter.gatech.edu) in Clough Commons.

**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 requirements 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 not to 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 made available for your use in the lab.

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 or ideas of others without 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 TAs for help as you write your lab notebook entries and lab reports 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).
<table>
<thead>
<tr>
<th>Lab</th>
<th>Date</th>
<th>Where</th>
<th>Topic</th>
<th>Due for lab (unless otherwise stated)</th>
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<tbody>
<tr>
<td>-</td>
<td>23-Aug</td>
<td>No lab</td>
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<tr>
<td>1</td>
<td>30-Aug</td>
<td>CE 123</td>
<td>Characterizing E coli B strain</td>
<td>Read E coli genetics primer</td>
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<td>9/3 by midnight: Lab notebook blog set up &amp; first entry</td>
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<tr>
<td>2</td>
<td>06-Sep</td>
<td>CE 123</td>
<td>Characterizing E coli B strain</td>
<td>Read Spencer et al 2007 for lab</td>
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<td>3</td>
<td>13-Sep</td>
<td>CE 206</td>
<td>Identify candidate genes using microarray data</td>
<td>Read Le Gac et al 2008 &amp; skim Le Gac Significant Genes table.xls on T-square</td>
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<td>4</td>
<td>20-Sep</td>
<td>CE 206</td>
<td>Candidate gene primer design</td>
<td>Prep for on-line notebook check Lab sessions 1–3</td>
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<td>5</td>
<td>27-Sep</td>
<td>CE 123</td>
<td>Candidate gene PCR</td>
<td>Lab Report 1: Characterization of E coli B strains (due in lab and on T-square)</td>
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<td>6</td>
<td>04-Oct</td>
<td>CE 123</td>
<td>PCR Electrophoresis and Sequencing</td>
<td>10/3 by midnight: Initial project proposal blog</td>
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<td>7</td>
<td>11-Oct</td>
<td>TBA</td>
<td>Project group work</td>
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<td>18-Oct</td>
<td>CE 123</td>
<td>Plasmids and insert expression</td>
<td>Lab Report 2: PCR to detect mutations in candidate gene (due in lab and on T-square)</td>
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<td>10/23 by midnight: Final Project Proposal</td>
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<td>25-Oct</td>
<td>CE 123</td>
<td>Plasmids and insert expression</td>
<td>Project reading/prep</td>
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<td>01-Nov</td>
<td>CE 123</td>
<td>Project lab day1</td>
<td>Project reading/prep</td>
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<td>08-Nov</td>
<td>CE 123</td>
<td>Project lab day2</td>
<td>Project reading/prep</td>
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<td>15-Nov</td>
<td>CE 123</td>
<td>Project lab day3</td>
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<td>22-Nov</td>
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<td>Thanksgiving Holiday</td>
<td>NONE</td>
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<td>13</td>
<td>29-Nov</td>
<td>TBA</td>
<td>Create group presentation</td>
<td>Notebooks due</td>
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<td>-</td>
<td>06-Dec</td>
<td>No lab</td>
<td>Project Presentations</td>
<td>Lab Report 3: Project Report (due in Dr. Spencer's mailbox in BioHub(next to CE206) &amp; on T-square)</td>
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