

# Biology 2354 HP: Honors Genetics

## Fall 2015 Syllabus

### Course Description and Goals

The 3.0 credit hour Honors Genetics course is designed for students who have demonstrated a good understanding of biology. The lecture course must be taken together with 2355HP Honors Genetics Lab. Although listed as separate courses, one cannot withdraw only from the lab course and continue taking the lecture course or vice versa. Both courses are intended to expand a student's knowledge in genetics beyond what is presented in typical undergraduate courses. The main goal of the lecture course is to enable students to understand and appreciate the fundamental concepts of genetics, and to learn how to apply these concepts to solving problems and interpreting experiments.

The course covers many of the basic sub-disciplines of genetics, those that were initially studied during the past century as well as those that were discovered very recently. The course includes in-depth coverage of some topics, in addition to a comprehensive coverage of general genetic principles. In-depth coverage emphasizes how genetic analysis techniques are used to uncover the genetic rules and mechanisms of inheritance. In addition to readings in the textbook, students will be given articles to provide more depth on certain topics and for discussion in class. Reading material will be available on T-square as PDF files or as web links and references.

#### **Professors: Contact Information (Office hours by appointment)**

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**Prerequisites:** Biol 1510 or 1511 or consent of the school. **Co-requisite:** Biol 2355HP

*\*Eligibility: Any student in Honors Program who has taken BIOL 1511, or any other student who has received an A or B in either BIOL 1510 or BIOL 1511 and currently has an overall GPA 3.0 or above.*

**Textbook** *R.J. Brooker (2015) Genetics Analysis & Principles (5th Edition). McGraw-Hill Educ. (required).*

**Attendance:** If you miss a lecture, *you* are responsible for obtaining all notes, announcements, and assignments. If you know that you must leave class early, sit in the back and leave quietly. *NOTE: Short answer quizzes will be given without warning as a means of assessing attendance and class understanding. Attendance will be taken into account in borderline grade situations. To quote Woody Allen, '80% of success is showing up'*

#### **Assessments:**

Exams - 80% (4 Exams - 20% each)

Quizzes/homeworks, and class participation - 20%

Scale: 90-100% - A, 80-89% - B, 70-79% - C, 60-69% - D, <60% - F

Written confirmation of a legitimate excuse, such as a severe illness, will be required for missing an exam. Your conduct in the course should conform to the Student Honor Code (<http://www.honor.gatech.edu/>).

**Tentative Lecture Schedule:** *Class meets on Tuesday and Thursday 9:30 to 11 AM*

Week 1	(08/18) (08/20)	Introduction & Mendelian Inheritance I (Ch. 1-2) Mendelian Inheritance and Probability (Ch. 2)
Week 2	(08/25) (08/27)	Chromosome Transmission in Eukaryotes (Ch. 3) Extensions of Mendelian Inheritance (Ch. 4)
Week 3	(09/01) (09/03)	Genetic Linkage and Mapping (Ch. 6) Gross Chromosomal Variation (Ch. 8)
Week 4	(09/08) (09/10)	Population Genetics (Ch. 26) REVIEW/DISCUSSION
Week 5	(09/15) (09/17)	<b>EXAM I</b> (covering weeks 1 – 4) Bacterial Genetics (Ch. 7)
Week 6	(09/22) (09/24)	DNA Technologies (Ch. 20) Genomics: DNA Analysis, Genomics (Ch. 22-23)
Week 7	(09/29) (10/01)	Genetic Engineering: Historical Perspectives (OM) Genetic Engineering: CRISPR-CAS9 (OM)
Week 8	(10/06) (10/08)	REVIEW/DISCUSSION <b>EXAM II</b> (covers weeks 1-8)
Week 9	(10/13) (10/15)	<b>FALL RECESS</b> Molecular Structures of DNA and RNA (Ch. 9)
Week 10	(10/20) (10/22)	Chromosome Organization (Ch. 10) DNA Replication (Ch. 11)
Week 11	(10/27) (10/29)	Gene Transcription and Modification I (Ch. 12) Gene Transcription and Modification II (Ch. 12)
Week 12	(11/03) (11/05)	Translation of mRNA (Ch. 13) Translation II & Review (Ch. 13)
Week 13	(11/10) (11/12)	REVIEW/DISCUSSION <b>EXAM III</b> (covers weeks 9-13)
Week 14	(11/17) (11/19)	Gene Regulation in Bacteria (Ch. 14) Gene Regulation in Eukaryotes I (Ch. 15)
Week 15	(11/24) (11/26)	Gene Regulation in Eukaryotes II (Ch. 16) <b>Thanksgiving Holiday</b>
Week 16	(12/01) (12/03)	Medical Genetics and Cancer (Ch. 24 & OM) REVIEW/DISCUSSION
Finals week	(12/07)	<b>FINAL EXAM</b> (covers weeks 9-16)

OM = Outside Material [will be provided to you]

**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](http://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 notebook entries and lab write-ups. **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 instructors for help as you work on assignments.

**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 Office of Disability Services (<http://disabilityservices.gatech.edu>).