

# BIO 3306 – Genetics

## Spring 2016

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**Instructor:** Dr. Dan H. Foley III  
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Office hours: Monday - Thursday (Del Rio) 11:00am – 12:00noon  
or by appointment

**Required Texts:** Hartwell, L.H., M.L. Goldberg, J.A. Fischer, L. Hood. 2015. Genetics: From Genes to Genomes, 5<sup>th</sup> edition. McGraw-Hill Co. NY, NY. 718 pp.

**Website:** **Blackboard** site for Genetics

**Course Objective:** There are five broad goals for this course:

- Can articulate and explain current Cell Theory of life functions and processes, the role and functioning of DNA as the molecule of heredity and evolutionary change, the evolution of life on Earth and the interactions of biotic and abiotic factors in the development of ecological communities.
- Can articulate and summarize the principals of research design and data analysis
- To provide students with a strong background in the principles of Mendelian genetics. Students will become familiar with Mendel's basic postulates and the additional insights that modern genetics has brought to this field.
- To provide students with the ability to solve problems and think analytically. Genetics, more than any other branch of biology, lends itself to problem solving and analytical thinking. Students will be assigned numerous problems in the text that will allow them to practice these skills. Exam questions will be designed to assess how well these skills have been mastered.
- To make students aware of the power of DNA technology. Basic concepts of DNA manipulations will be taught and examples of how these manipulations can be used in medicine and industry will be given.
- To help students become familiar with the language of genetics and the terminology of molecular biology.
- To prepare students for more advanced course work in cell and molecular biology.

## Tentative Lecture Schedule

(note: exact date are subject to change, be sure to keep abreast of changes).

Date	Topic	Readings
January	19.....Introduction.....	Chapter 1
	21.....Mendel’s Breakthrough .....	Chapter 2
	26.....Single–gene inheritance .....	Chapter 3; 3.1
	28.....Multifactorial Inheritance .....	Chapter 3; 3.2
February	2.....Chromosomes; Mitosis; Meiosis .....	Chapter 4; 4.1-4.4
	4.....Gametogenesis; Chromosome Theory; Sex-linkage.....	Chapter 4; 4.5-4.7
	9.....Gene linkage; recombination; mapping .....	Chapter 5; 5.1-5.3
	11.....Chi-square test; Mitotic Recombination;.....	Chapter 5; 5.4 & 5.6
	<b>16 .....</b>	<b>Exam 1 (Chapters 1-5)</b>
	18 .....	DNA .....
	23 .....	DNA replication & recombination.....
	25 .....	Mutations and their mechanisms .....
	25 .....	Mutations & gene structure and function.....
	March	1 .....
3 .....		Translation & Expression: Prokaryote vs. Eukaryote.....
<b>8 .....</b>		<i>review</i>
<b>10 .....</b>		<b>Exam 2 (Chapters 6-8)</b>
15 .....		<i>Spring Break – No Classes</i>
17 .....		<i>Spring Break – No Classes</i>
22 .....		Fragmenting, Cloning & sequencing DNA .....
24 .....		Sequencing genomes, finding genes and gene evolution.....
29 .....		The Eukaryotic chromosome .....
31 .....		Chromosomal rearrangement & Transposable elements .....
5 .....		Change in chromosome number .....
<b>7 .....</b>		<i>Review</i>
<b>12 .....</b>		<b>Exam 3 (Chapters 9; 12-13)</b>
14 .....		The Prokaryotic chromosome and genomes .....
19 .....	Gene transfer & bacterial genetic analysis.....	
21 .....	Gene regulation in Prokaryotes.....	
26 .....	Gene regulation in Prokaryotes .....	
28 .....	Gene regulation in Eukaryotes .....	
May	3 .....	Gene regulation in Eukaryotes.....
	<b>5 .....</b>	<i>Review</i>
	<b>10 .....</b>	<b>Final Exam (Chapters 14-16)</b>

**Grade assessment:**

There will be **4 lecture** examinations. Each lecture exams will be worth 100 points. The final exam is mandatory and is also worth 100 points. In addition, you will be required to complete **13 Homework Assignments**. You will receive 10 points per homework assignment. Therefore a total of 130 points can be achieved by successfully answering and completing all 13 homework assignments. Therefore, there are a total of 530 possible points during this course:

4 exams	400
13 homework assignments	130
<u>Total</u>	<u>530</u>

<u>Total points</u>	<u>Percent</u>	<u>Letter Grade</u>
477 – 530	90 – 100%	A
424 – 476	80 – 89.9%	B
371 – 423	70 – 79.9%	C
318 – 370	60 – 69.9%	D
317 or less	< 60%	F

**Homework Problems:**

At the end of each chapter are a number of practice problems which highlight the concepts covered within that chapter. The odd numbered questions are answered for you in the rear of your text book. I highly recommend you attempt to answer each of these questions for your self and self check your answers with those given in the rear of your text book.

Additionally, I will provide additional homework questions/problems to test your understanding of recently discussed concepts. These problem set will be posted on the Blackboard web site for your retrieval.

Students may work together while attempting to work your solutions for homework problems, but all answers submitted for grading must be written by you alone. Homework assignments turned in by a group will receive no credit. Additionally, one of the main reasons for homework problems is to get the student to practice their problem solving skills. Therefore, while answering your homework questions show all the steps necessary for you to come to your answer. Problems in which only the answer is given and no justification in how that answer was achieved will receive no credit. **YOU MUST SHOW ALL YOUR WORK!!!** All homework problems **MUST** be typed and turned into the Genetics Blackboard site via the Digital Drop-box feature.

**Study Tips:**

Everyone has their own unique way of learning. How you study rather than how long you study will have a huge impact on your grade in this course. If you use all the resources available to you and take an active role in the learning process you will likely do much better.

Some specific tips are:

- Spend 20 – 30 minutes to skim through each reading assignment before class.
- Review the lecture notes and read the assigned reading
- Try to draw diagrams from lecture and the book from memory
- Make flash cards or important concepts and terms
- Call up a friend and try to explain what you have learned in class
- ASK QUESTIONS! You are not in this class alone, if you don't understand something, more than likely your classmates also don't understand.

**Disabled Students:**

Reasonable accommodations will be provided for students with disabilities. Please meet with me the first week of class to discuss any special needs you may have.

**Academic Honesty:**

Cheating will not be tolerated. The University expects all students to engage in all academic pursuits in a manner that is above reproach and to maintain complete honesty and integrity in the academic experiences both in and out of the classroom. "Cheating" includes, but is not limited to:

- Copying from another student's test paper, a laboratory report, other report, or computer files, data listings, and/or programs.
- Using, during a test, materials not authorized by the person giving the test.
- Collaborating, without authorization, with another person during an examination or in preparing academic work.
- Knowingly, and without authorization, using, buying, selling, stealing, transporting, soliciting, copying, or possessing, in whole or in part, the contents of an unadministered test.
- Substituting for another student; permitting any other person; or otherwise assisting any other person to substitute for oneself or for another student in the taking of an examination or test or the preparation of academic work to be submitted for academic credit.
- Bribing another person to obtain an unadministered test or information about an unadministered test.
- Purchasing, or otherwise acquiring and submitting as one's own work any research paper or other writing assignment prepared by an individual or firm. This section does not apply to the typing of the rough and/or final versions of an assignment by a professional typist.

Plagiarism will not be tolerated. "Plagiarism" means the appropriation and the unacknowledged incorporation of another's work or idea into one's own work offered for credit. This includes verbatim written answers by colleagues with whom you might discuss laboratories exercises. Plagiarism also includes copying information from internet resources. To avoid plagiarism, make sure you always use your own words to construct your written answers.