

# Biology 305 - Genetics

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<b>Class:</b>	Section 1: 10:00am – 10:50am, RITA Rm. 154 Section 3: 9:00am – 9:50am, RITA Rm. 154
<b>Instructor:</b>	Dr. Christine Byrum
<b>Email:</b>	<a href="mailto:byrumc@cofc.edu">byrumc@cofc.edu</a>
<b>Phone:</b>	(843) 953-7176
<b>Office:</b>	233 RITA
<b>Office Hours:</b>	1:30-2:30 Monday, 2:00-3:00 pm Thursday, or by appointment
<b>TA:</b>	Jenna Klingsick ( <a href="mailto:klingsickjr@g.cofc.edu">klingsickjr@g.cofc.edu</a> )

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## Course Description:

This course provides a general overview of genetics, the study of heredity and variation. During the first half of the course, basic genetic principles from classic Mendelian genetics are stressed. Students will learn about concepts including Mendelian inheritance, how to apply principles of probability to genetics, epistasis, linkage analysis, and pedigree analysis. Later in the semester, the class will explore molecular genetics as well as other current subjects in the field. Topics include but are not limited to mutation, bacterial genetics, epigenetics, gene regulation, quantitative genetics, developmental genetics, cancer, and genomics. This course is required for all Biology majors and is highly recommended for those entering the areas of: medicine, forensic science, biology education, genetic counseling, nursing, biotech law, veterinary medicine, cancer research, agriculture, pharmacy, zoology, bioinformatics, dentistry, botany, cell biology, ecology, marine biology, conservation, microbiology, or molecular biology.

## Course Objectives:

Students should be familiar with terminology used by geneticists as well as the principles and theories discussed over the course of this class. They will be expected to coherently explain concepts and, in some cases, to apply these concepts to new situations or to predict outcomes based on what they have learned in class. Students should strive to develop critical thinking skills. Much of genetics involves problem solving. These problems can vary in format. Many involve simple mathematics (familiarity with basic math and algebraic principles is crucial), whereas others are word problems that require the student to logically deduce an answer or to design an experiment based on materials discussed from the class. Students should also be able to list, differentiate, classify, or illustrate terms/structures/processes, to draw diagrams illustrating genetic principles, and to graph data.

**Text:** *Genetics: A Conceptual Approach, 6th edition.* Benjamin Pierce, 2016  
(W.H. Freeman and Company).

**Prerequisites:** Biology 111, 112. Biology 211/211D should be completed prior to this class or may be taken concurrently.

**Assignments:**

**Tests (3 tests and final exam).....65%**

The highest test score will be worth 20% of the student’s grade, while scores of the remaining 3 exams are worth 15% each. The final exam will be cumulative. Tests/exams will be based on all materials from the lecture, assigned problems, and assigned readings in the book. Lecture material may cover subject matter absent in your book.

Missing a test without permission from the instructor will result in a zero. Make-up tests will not be given except under extenuating circumstances (being nervous about taking the test is not an acceptable excuse). If the student cannot take a test, they are expected to contact the instructor BEFORE the exam and will be asked to obtain an official excuse from the dean of undergraduate affairs office before rescheduling. Whether the student is allowed to take a make-up test is entirely at the discretion of the instructor regardless of a letter from the dean.

During tests, each student will be allowed to use a calculator. It is the student’s responsibility to remember to bring a calculator to class for the test. Cell phone calculators are not to be used during testing and students may not share calculators. Students are expected to remain in the classroom for the duration of the test.

**Quizzes.....20%**

Short announced quizzes will be given throughout the semester. Questions on quizzes will be derived from materials recently covered in class or from assigned readings/problems.

**Class Exercises.....15%**

Short in-class exercises will be assigned several times over the course of the semester. Students are expected to complete these during the class period. Make-up assignments will only be approved with an official excuse from the dean of undergraduate affairs office at the discretion of the instructor.

**Grading Scale:**

93 and above: A	73-76.9: C
90-92.9: A-	70-72.9: C-
87-89.9: B+	67-69.9: D+
83-86.9: B	63-66.9: D
80-82.9: B-	60-62.9: D-
77-79.9: C+	below 60: F

## Course Policies

**Classroom Courtesy:** Students are expected to turn off cell phones or any other disruptive devices during lectures, tests, quizzes, or final exams. Exceptions will be made in extreme situations such as spouses anticipating the birth of a child or a serious emergency. Permission to leave an electronic device on should be obtained prior to class. Students are not to text message, instant message, use Facebook, or perform web searches unrelated to class activities/assignments. Cell phones may not be used as calculators during tests.

**Attendance:** Students are expected to attend class. Those who excel in this course generally prepare before lecture by reading the book, attend review sessions, and do not miss class. In the case of sickness or other unanticipated situations that prevent class attendance, the student should be sure to get notes from a classmate and review posted materials.

**Policy in Event of Campus Evacuation:** If the college closes and members of the community are evacuated due to inclement weather, students are responsible for taking course materials with them in order to continue with course assignments consistent with instructions provided by faculty. In cases of extended periods of institution-wide closure where students have relocated, instructors may articulate a plan that allows for supplemental academic engagement despite these circumstances.

**OAKS:** Lecture notes will be made available on OAKS prior to class. Be aware that the notes posted before lecture may be revised and re-posted after lecture at the instructor's discretion. Although the slides are designed to aid in preparation for tests, other materials presented in class (orally, on the board, etc.) are also likely to be important. Regular class attendance is crucial to understanding the materials. OAKS will also be used to post answers to assigned problems, study guides, and a copy of this syllabus.

**Genetics Lab:** Although the Genetics Lab (Biol 305L) is an excellent course to complement Biology 305, students in Genetics are not required to enroll in the Biol 305L. This course is not required for most Biology majors, however those pursuing a B.S. in Biology with an emphasis in Molecular Biology are required to take Genetics Lab and will probably get the maximum benefit by taking this concurrently with Biol 305. Biol 305L also qualifies as an upper level laboratory course that can be applied towards a Biology degree.

**Office Hours:** Office hours will be 1:30-2:30 Monday and 2:00-3:00 pm Thursday. If this is not a good time, contact the instructor by email, telephone, or after class and schedule a different time. Students having any questions about the materials or the class are highly encouraged to come by and discuss it with the instructor. The class TA will also offer weekly sessions where students can discuss/review recent material covered in class.

**Academic Integrity:** Students are expected to behave in an honest and responsible manner. Violations of the honor code are offensive and will generally be dealt with severely. We will adhere to the following policy as quoted from the Honor Council's recommended guidelines:

"Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when identified, are investigated. Each incident will be examined to determine the degree of deception involved. Incidents where the instructor determines that the student's actions are related more to a misunderstanding will be handled by the instructor. A written intervention designed to help prevent the student from repeating the error will be given to the student. The intervention, submitted by form and signed both by the instructor and the student, will be forwarded to the Dean of Students and placed in the student's file.

Cases of suspected academic dishonesty will be reported directly by the instructor and/or others having knowledge of the incident to the Dean of Students. A student found responsible by the Honor Board for academic dishonesty will receive a XXF in the course, indicating failure of the course due to academic dishonesty. This status indicator will appear on the student's transcript for two years after which the student may petition for the XX to be expunged. The F is permanent. The student may also be placed on disciplinary probation, suspended (temporary removal) or expelled (permanent removal) from the College by the Honor Board.

Students should be aware that unauthorized collaboration--working together without permission--is a form of cheating. Unless the instructor specifies that students can work together on an assignment, quiz and/or test, no collaboration during the completion of the assignment is permitted. Other forms of cheating include possessing or using an unauthorized study aid (which could include accessing information via a cell phone, tablet, or computer), copying from others' exams, fabricating data, and giving unauthorized assistance.

Research conducted and/or papers written for other classes cannot be used in whole or in part for any assignment in this class without obtaining prior permission from the instructor. Students can find the complete Honor Code and all related processes in the *Student Handbook* (<http://studentaffairs.cofc.edu/honor-system/studenthandbook/index.php>).

**Center for Student Learning:** Students are encouraged "to utilize the Center for Student Learning's (CSL) academic support services for assistance in study strategies, speaking & writing strategies, and course content. They offer tutoring, Supplemental Instruction, study strategy appointments, and workshops. Students of all abilities have become more successful using these programs throughout their academic career and the services are available to you at no additional cost. For more information regarding these services please visit the CSL website at <http://csl.cofc.edu> or call (843) 953-5635."

**Accommodations for Students with Disabilities:** Any student who needs accommodations because of a disability should talk to the professor about this during the first week of classes or as soon as they have been approved for these services so that this can be addressed. For more information on Disability Services, call the campus office at (843) 953-1431 or refer to their website: <http://disabilityservices.cofc.edu>

**Veterans/Active Duty Personnel:** Veterans and active duty personnel with special circumstances (e.g. upcoming deployments, drill requirements, disabilities) are welcomed/encouraged to communicate these, in advance if possible, to the instructor.

**Food/Housing Insecurity:** If you are not economically secure in food and housing, the College has assistance programs. Contact the Dean of Students directly, or I will be happy to provide confidential assistance.

## Lecture Schedule

<b>Date</b>	<b>Topic</b>	<b>Readings</b>
Jan. 8 – W	Basic Principles of Heredity	Ch. 3
Jan. 10 – F	Basic Principles of Heredity	Ch. 3
Jan. 13 – M	Probability	Ch. 3
Jan. 15 – W	Binomial Expansions, Chi Square Tests	Ch. 3
Jan. 17 – F	Sex Linked Traits	Ch. 4
Jan. 20 – M	<b>Martin Luther King Day</b> (no class)	
Jan. 22 – W	Sex Determination	Ch. 4
Jan. 24 – F	Extensions/Modifications of Basic Principles	Ch. 5
Jan. 27 – M	Extensions/Modifications of Basic Principles	Ch. 5
Jan. 29 – W	Discovery that DNA is Genetic Material	Reserves: Paper A
Jan. 31 – F	Genes and Proteins	Reserves: Paper A
Feb. 3 – M	Identifying Genes	Reserves: Paper A
Feb. 5 – W	<b>TEST 1</b>	
Feb. 7 – F	DNA Structure and Genetic Variation	Reserves: Paper B
Feb. 10 – M	DNA Structure and Genetic Variation	Reserves: Paper B
Feb. 12 – W	Linkage and Recombination	Ch. 7
Feb. 14 – F	Linkage and Recombination	Ch. 7
Feb. 17 – M	Linkage and Recombination	Ch. 7
Feb. 19 – W	Bacterial Genetics	Ch. 9
Feb. 21 – F	Bacterial Genetics (Last day to withdraw with a “W”)	Ch. 9
Feb. 24 – M	Human Genetics/Pedigree Analysis	Ch. 6
Feb. 26 – W	Pedigree Analysis	Ch. 6
Feb. 28 – F	Chromosome Variation	Ch. 8

March 2 – M	<b>TEST 2</b>	
March 4 – W	Chromosome Variation	Ch. 8
March 6 – F	Transposable Elements	Ch. 18
March 9 – M	Transcription	Ch. 13
March 11 – W	RNA processing/Translation	Ch. 14, 15
March 13 – F	Translation/Gene Mutations	Ch. 15, 18
March 16-20	<b>Spring Break</b>	
March 23 – M	Gene Mutations	Ch. 18
March 25 – W	DNA repair	Ch. 18
March 27 – F	Gene Regulation	Ch. 16, 17
March 30– M	Bioinformatics	Assigned Reading
April 1 – W	Bioinformatics	Assigned Reading
April 3 – F	Genomics	Ch. 20
April 6 – M	<b>TEST 3</b>	
April 8 – W	Quantitative Genetics	Ch. 24
April 10 – F	Quantitative Genetics	Ch. 24
April 13 – M	Quantitative Genetics	Ch. 24
April 15 – W	Developmental Genetics	Ch. 22
April 17 – F	Cancer	Ch. 23
April 20 – M	Epigenetics	Ch. 21
April 22 – W	TBA	
April 24-29 –	<b>Final Exams</b>	<b>9:00am class: Friday April 24, 8-11:00 am</b> <b>10:00am class: Monday April 27, 8-11:00 am</b>

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*\* Schedule may vary subject to scheduling changes and other modifications as needed.*