

**Instructor:** Dr. William H. Jackson  
**Office:** SBDG 201A                      **Office hours:** By appointment  
**Telephone:** 641-3601                      **Email:** [Billj@usca.edu](mailto:Billj@usca.edu)  
**Lecture:** TTH,8:00-9:15 in SBDG 200                      **Text:** **Genetics: From Genes to Genomes, 3<sup>rd</sup> Edition** by Hartwell, et al.  
**Laboratory:** M, 10:00-12:40 in SBDG 108  
See Laboratory Syllabus  
**Supplies:** Scantron Sheets and Scientific calculator, Lab notebook                      **Credit:** Four (4) Semester Hours  
**Writing Papers in the Biological Sciences., 4<sup>th</sup> Edition** by McMillan

**Course Description:** Fundamental Genetics is a four credit hour course for biology majors, which covers the principles of transmission, molecular, and population genetics. Topics covered will include Mendelian genetics, quantitative inheritance, linkage, recombination, the biochemical aspects of gene function and regulation, and developmental and population genetics.

**Course Objectives:** This course will introduce the student to the underlying principles of genetics. It is divided into transmission and molecular genetics. On completion of this course students will be expected to

1. Demonstrate an understanding of transmission genetics;
2. Demonstrate an understanding of molecular genetics;
3. Demonstrate an ability to write and discuss applications of genetic concepts;
4. Prepare written and oral reports of data
5. Solve genetics problems using appropriate mathematical techniques in conjunction with data collected in the genetics laboratory;

**Attendance Policy:** Students are expected to adhere to the University attendance policy as stated in the Student Handbook. In this regard, the instructor may impose a penalty for absences in excess of 25% of regularly scheduled class meetings by assigning an "F" in the course. Absences, *neither excused nor unexcused*, absolve the student from meeting class assignments. Because of their nature, laboratory exercises cannot be made up – students should make every effort to attend all laboratory sessions.

**Disability Statement:** If you have a physical, psychological, and/or learning disability, which might affect your performance in class, please contact the Office of Disability Services, 126A B&E (803) 641-3609, as soon as possible. The Disability Services Office will determine appropriate accommodations based on medical documentation.

**Methods of Presentation and Evaluation:** Information will be presented through lectures, class discussions, and laboratory exercises using appropriate visual aids and laboratory equipment. Student progress will be assessed through two 1-hour lecture exams, a Genetics Problem Set exam, a comprehensive final exam, and weekly quizzes (lecture and lab). Several assignments will be handled through Blackboard. The final course evaluation will be based on the following weighted assignments:

Description	Percentage	Comments
Two 1-hr exams	30%	300 points (each exam = 15%)
Genetics Problem set	15%	150 points (Transmission genetics problems)
Final Exam	15%	150 points (Comprehensive final exam)
Weekly Quizzes	15%	150 points (Material discussed the previous 1 – 2 weeks)
Laboratory	25%	250 points See Laboratory Syllabus supplement

The letter grades will be based on total accumulated points and will be assigned as follows: A>900; B>800; C>650; D>550; F<550. Biology majors must make a C or better in this core course.

TENTATIVE LECTURE SCHEDULE

Date	Week	Topic/Comments	Chapter
Aug 21	1	Mendel's Breakthrough	2
Aug 26	2	Mendel's Breakthrough	3
Aug 28		Extensions to Mendel	3
Sep 2,4	3	Extensions to Mendel	3
Sep 9,11	4	The Chromosomal Theory of Inheritance	4
Sep 16,18	5	Linkage and Mapping	5
Sep 23	6	Linkage and Mapping	5
Sep 25		<b>Exam I</b>	<b>2-5</b>
Sep 30	7	DNA: Recombination and Replication	6
Oct 2		DNA: Recombination and Replication	6
Oct 7	8	DNA: Recombination and Replication	6
Oct 9		<b>Fall Break (Oct 9 – 10)</b>	6
Oct 14,14	9	DNA: Recombination and Replication	
Oct 21	10	DNA: Recombination and Replication	6
Oct 23		Gene Structure and Function	7
Oct 28,30	11	Gene Structure and Function	7
Nov 4,6	12	Gene Structure and Function	7
Nov 11	13	Gene Expression	8
Nov 13		<b>Exam II</b>	<b>6-7</b>
Nov 18,20	14	Gene Expression	8
Nov 25	15	Gene Expression	8
Nov 26		<b>Thanksgiving Holiday (Nov 21 – 23)</b>	8
Dec 2,4	16	Biotechnology	
Dec 11		<b>Final Exam</b> at 8:00 AM in SBDG 200	<b>6-8</b>

You will be expected to endorse the USCA HONOR PLEDGE on every assignment: 'On my honor as a University of South Carolina Aiken student, I have neither given nor received any unauthorized aid on this assignment/examination. To the best of my knowledge, I am not in violation of academic honesty'

**Genetics Laboratory:** Genetics Laboratory is not separate from Genetics Lecture; therefore, students are expected to synthesize the material covered in lecture, laboratory, and the text. Each student is expected to meet every laboratory session, as it is impossible to recreate the laboratory setup after the scheduled meeting time. In general, each laboratory meeting will be divided into three sessions and designed to (1) extending lecture, (2) practice genetics problems, and (3) carry out assigned laboratory exercises. Several laboratory meetings will be required to work on genetic crosses between mutant strains of *Drosophila melanogaster* and will require several weeks to complete. Because the laboratory studies involve living systems, the student must be prepared to work on the project when the need arises. While some of the work can be done during normal laboratory meeting times, this is not always the case. Genetics problems will be introduced via Blackboard quizzes that will be available the week prior to each lab meeting. Students are required to complete each quiz prior to the lab meeting. Online quizzes serve as practice and review for in-class quizzes and exams. In-class quizzes will be administered at the beginning of each lab meeting and will be similar to the preceding online quiz. In addition the Genetics Problem Set will include problems similar to the online and in-class quizzes. A second major component of genetics laboratory is a research project on a specific genetic disease. Students will carry out a literature search and write a one-page summary that includes at least three references from peer-reviewed journals and/or medical textbooks. References must be cited using CSE format (Chapter 4 in the supplemental text). Students will also give a 10-minute oral presentation of their topic during the scheduled laboratory periods on Nov 26 and Dec 3. PowerPoint is required for these presentations.

**Students are strongly cautioned to be on their guard against plagiarism when preparing all reports.** All reports must be submitted in hardcopy and electronic formats. The electronic copy will be monitored for plagiarism.

**Grading:** The laboratory component of ABIO 350 is worth 25% (250 points) of the final course grade and will be based on both written and oral reports. The due dates and total points for each assignment are shown in the table below:

<b>Project</b>	<b>Due Date</b>	<b>Points</b>
Probability/hypothesis testing report	Sep 5	5
Sample data set report	Sep 19	5
Drosophila cross one report	Nov 7	50
Drosophila cross two report	Nov 7	50
Drosophila cross three report	Nov 7	50
Drosophila cross four report	Nov 7	50
Disease research summary and bibliography	Dec 1	20
Oral presentations	Nov 24, Dec 1	20
<b>TOTAL</b>		<b>250</b>

**TENTATIVE LABORATORY SCHEDULE**

<b>Date</b>	<b>Meeting</b>	<b>Exercise</b>	<b>Source</b>
Aug 25	1	Introduction to genetics lab (syllabus); Group organization Probability and Hypothesis Testing	Coin Toss
Sep 8	2	Introduction to genetics research – Writing a Lab Report Introduction to <i>Drosophila melanogaster</i>	Chapter 4
Sep 15	3	Introduction to <i>Drosophila melanogaster</i> Monohybrid cross; Sample Data Set	Handout
Sep 22	4	Monohybrid and Dihybrid Cross	Chapter 4
Sep 29	5	Monohybrid and Dihybrid Cross	
Oct 6	6	Sex Linkage Cross	Handout
Oct 13	7	Sex Linkage	Handout
Oct 20	8	Linkage cross	
Oct 27		Linkage maps	
Nov 3	9	<b>PROBLEM SET EXAM</b>	
Nov 10	10	Introduction to research (library); Topic assignments <i>Drosophila cross write ups due</i>	Chapter 6 Chapter 10
Nov 17	11	<b>Problem set review</b> Research	Handout
Nov 24	12	Oral presentations of research topics	Handout
Dec 1	13	Oral presentations of research topics	

**Laboratory Reports.** Written laboratory reports will be required for several exercises (see above). All reports are required to be one-page in length and follow the following criteria: double-spaced with 1-inch margins and 11 point Times New Roman font. Each report will be written in the form of a scientific paper and include the following: Title, Introduction, Methods, Results, and Discussion. A more complete discussion of how to write laboratory report can be found in chapter 4 of your supplemental text: **Writing Papers in the Biological Sciences, 4<sup>th</sup> Edition** by McMillan.

Specific requirements for writing laboratory reports for Genetics can be found on the Genetics Blackboard site.