

BIO 3306 – Genetics

Fall 2020

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Office hours: Monday - Thursday 10:00am – 11:00am via telephone
or by appointment

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

McGraw Hill Connect access for Genetics

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.

Marketable Skills: Students who successfully complete the BS in Biology program will gain the following marketable skills:

- Students will be able to organize, analyze, and interpret data. For the BS program, this will be handled by various upper level courses including the reading of scientific papers, which require the students to read data in papers, process and understand the results to see if they make sense, and the determine if their conclusions match those in the paper.
- Students will be proficient at using presentation software. This will be disseminated in the BS program by many of the upper level courses, which currently require semester project presentations.
- Students will acquire experience in managing time and meeting deadlines. Students will be provided with deadlines for completing these tasks, and work on meeting these requirements

and deadlines. For the BS in Biology, course will have assignments and exams at scheduled intervals. If these deadlines for these assignments are not met, student's scores and grades will be penalized.

- Students will gain the ability to speak effectively and write concisely about scientific topics. In the BS program, semester project presentations and capstone research projects will be assessed including oral or poster presentations. This will culminate in presentation which can be secondarily used for any professional meetings presented at. Presentations in the form of poster (for written) and oral (for verbal communication) will help to establish these practices.
- Students will acquire experience and guidance in the development of professional email correspondence. In the BS program, students will be instructed in their classes how to compose e-mail to their professors, including their name, complete sentences, respectful questions for clarification, and the proper way to address their faculty. This skill will be practiced through the degree in all classes through the correspondence between students and faculty over the 4 years they are in the program.

Tentative Lecture Schedule

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

Date	Topic	Readings
August	25..... Introduction	Chapter 1
	27..... Mendel's Breakthrough	Chapter 2
September	1..... Single-gene inheritance	Chapter 3; 3.1
	3..... Multifactorial Inheritance	Chapter 3; 3.2
	8..... Chromosomes; Mitosis; Meiosis	Chapter 4; 4.1-4.4
	10..... Gametogenesis; Chromosome Theory; Sex-linkage	Chapter 4; 4.5-4.7
	15..... Gene linkage; recombination; mapping	Chapter 5; 5.1-5.3
	17..... Chi-square test; Mitotic Recombination;	Chapter 5; 5.4 & 5.6
	22..... Exam 1 (Chapters 1-5)	
October	24..... DNA	Chapter 6; 6.1-6.3
	29..... DNA replication & recombination	Chapter 6; 6.4-6.5
	1..... Mutations and their mechanisms	Chapter 7; 7.1-7.2
	6..... Mutations & gene structure and function.....	Chapter 7; 7.3-7.4
	8..... The genetic code; Transcription.....	Chapter 8; 8.1-8.2
	13..... Translation & Expression: Prokaryote vs. Eukaryote	Chapter 8; 8.3-8.4
	15..... Exam 2 (Chapters 6-8)	
November	20..... Fragmenting, Cloning & sequencing DNA	Chapter 9; 9.1-9.3
	22..... Sequencing genomes, finding genes and gene evolution	Chapter 9; 9.4-9.5
	27..... The Eukaryotic chromosome	Chapter 11
	29..... Chromosomal rearrangement & Transposable elements.....	Chapter 12; 12.1-12.3
	3..... Change in chromosome number.....	Chapter 12; 12.4-12.5
	5..... Exam 3 (Chapters 9; 11-12)	
	10..... The Prokaryotic chromosome and genomes	Chapter 13; 13.1-13.3
12..... Gene transfer & bacterial genetic analysis.....	Chapter 13; 13.4-13.5	
December	17..... Gene regulation in Prokaryotes	Chapter 15; 15.1-15.2
	19..... Gene regulation in Prokaryotes	Chapter 15; 15.3-15.4
	24..... <i>Thanksgiving Holiday -No Classes-</i>	
	26..... <i>Thanksgiving Holiday -No Classes-</i>	
	1..... Final Exam (Chapters 14-16)	

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** derived from your textbook's supplementary content. You will receive 25 points per homework assignment. Therefore, a total of 325 points can be achieved by successfully answering and completing all 13 homework assignments.

Therefore, there are a total of 725 possible points during this course:

4 exams	400
<u>13 homework assignments</u>	<u>325</u>
Total	725

<u>Total points</u>	<u>Percent</u>	<u>Letter Grade</u>
653 – 725	90 – 100%	A
580 – 652	80 – 89.9%	B
508 – 579	70 – 79.9%	C
435 – 507	60 – 69.9%	D
434 or less	< 60%	F

Additional 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 yourself and self-check your answers with those given in the rear of your textbook.

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.

SRSU Disability Services. Sul Ross State University (SRSU) is committed to equal access in compliance with Americans with Disabilities Act of 1973. It is SRSU policy to provide reasonable accommodations to students with documented disabilities. It is the student's responsibility to initiate a request each semester for each class. Students seeking accessibility/accommodations services must contact Rebecca Greathouse Wren, LPC-S, SRSU's Accessibility Services Coordinator at 432-837-8203 (please leave a message and we'll get back to you as soon as we can during working hours), or email rebecca.wren@sulross.edu. Our office is located on the first floor of Ferguson Hall (Suite 112), and our mailing address is P.O. Box C-122, Sul Ross State University, Alpine, Texas, 79832.

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.

SRSU Distance Education Statement. Students enrolled in distance education courses have equal access to the university's academic support services, such as Smarthinking, library resources, online databases, and instructional technology support. For more information about accessing these resources, visit the SRSU website. Students should correspond using Sul Ross email accounts and submit online assignments through Blackboard, which requires secure login information to verify students' identities and to protect students' information. The procedures for filing a student complaint are included in the student handbook. Students enrolled in distance education courses at Sul Ross are expected to adhere to all policies pertaining to academic honesty and appropriate student conduct, as described in the student handbook. Students in web-based courses must maintain appropriate equipment and software, according to the needs and requirements of the course, as outlined on the SRSU website.

Technical Support. SRSU 24/7 Blackboard Technical Support: Toll Free: 888.837.6055.
Email: blackboardsupport@sulross.edu

SRSU Library Services. The Sul Ross Library offers FREE resources and services to the entire SRSU community. Access and borrow books, articles, and more by visiting the library's website, library.sulross.edu. Off-campus access requires your LoboID and password. Check out materials using your photo ID. Librarians are a tremendous resource for your coursework and can be reached in person, by email (srsulibrary@sulross.edu), or phone (432-837-8123).