

BIOL 271: Heredity

Fall 2024, Bailey 101

TR 12:30-1:45 (section 01)

TR 2:00-3:15 (section 02)

Prerequisites:

At least one college level Biology course or permission of the instructor

Note: This class *cannot* be used for credit toward the Biology major but does count for the Biology minor.

Instructor:

Dr. Betsy Hutchison

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Phone: 585-245-5038

Office Hours: Tues, Wed, & Thurs from 9:30-10:30 in ISC 359, or by appointment.

Course Description

Heredity reviews the principles of human genetics and the many ways in which genetics and biotechnology affect our lives. The topics covered include transmission genetics, cytogenetics, DNA structure and function, biotechnology, population genetics, genetic disorders, mutations, and cancer.

Learning Outcomes:

At the conclusion of the course:

- Students will be able to explain the fundamental principles of transmission genetics, molecular genetics, and population genetics at the level appropriate for educated, non-biology majors.
- Students will be able to describe the causes, characteristics, and management strategies for common human genetic diseases.
- Students will have practiced problem solving, critical thinking, and communication skills with respect to genetic problems.
- Students will be able to describe and discuss current issues in genetics and biotechnology, and their relationships to fundamental genetic principles

Required Texts

Human Genetics: Concepts and Applications, 14th edition, by Ricki Lewis (McGraw Hill, ISBN-13: 9781265351281) is the main text for the course and is available in the bookstore as well as online to rent. You're welcome to use an older edition but please note that you're responsible for the material in the required version of the textbook.

Calculator

You'll need a simple calculator (with basic functions) in order to complete some assignments for the course. Graphing calculators are not permitted for exams.

Grading

Assignment	%
Exams (4 total)	50%
Homework Assignments (group; 1 per module)	15%
Semester Project	25%
Brainstorming and ideas (individual)	5%
Draft of project (group)	10%
Final project (group)	10%
Participation (TopHat Questions or other; lowest 3 dropped)	10%

The following scale will be used to calculate final grades. Student point totals or grading scheme may be adjusted to reflect course difficulty or section differences at the instructor's discretion.

	B+ 87.0-89.9%	C+ 77.0-79.9%		
A 93.0-100%	B 83.0-86.9%	C 73.0-76.9%	D 60.0-69.9%	E <60%
A- 90.0-92.9%	B- 80.0-82.9%	C- 70.0-72.9%		

Standard rounding procedures will apply. For example, an 82.4 would be rounded to a B-, and an 82.5 would be rounded to a B.

Grade disputes must be initiated within one week from when the assignment was handed back. If you have a grade dispute, you must submit your original assignment along with a written justification of your answer.

Late Assignments

Late assignments will have a 10% grade reduction per day, and will not be accepted more than 2 days late.

Participation and TopHat questions

We will have at least 1 (likely >1) TopHat question per class. The questions will be graded primarily for participation (70%) but also on accuracy (30%). Your grade for the TopHat

questions will make up your participation grade. In addition, I may occasionally have other in-class activities that you will turn in for participation, depending on the class. Overall I will drop the lowest 3 TopHat/Participation scores in your grade calculation.

Exams

Make up exams are not administered without prior approval to missing the exam. Safety is a priority, and please do not attend class or an exam if you have tested positive for COVID or are very ill. It is your responsibility to be in contact with me for (1) approval to miss the exam and (2) scheduling a make-up exam. Exam format: exams will be administered in class (75 min). There will not be a cumulative final exam.

Please note the exam dates for this course. If you have a legitimate scheduling conflict you must notify me within the first 2 weeks of class. Otherwise, you will have to take exams as scheduled in the syllabus. If you are ill or have another unexpected issue come up, you must have approval for a make-up exam before missing it, otherwise you cannot make up the exam.

Asking for help

My goal for the course is for you to learn about genetics. My job is to create learning materials and assessments that promote learning, and provide you with clear guidelines on how to succeed. My job is also to answer your questions and help to foster your scientific curiosity. I'm here to help, and in fact chatting with students and answering their questions is one of the best parts of my job! So, please don't hesitate to reach out if you have questions about the course material, or other general student questions. Asking for help is a sign of self awareness and strength.

Accessibility

SUNY Geneseo is dedicated to providing an equitable and inclusive educational experience for all students. The Office of Accessibility will coordinate reasonable accommodations for persons with documented physical, emotional, or cognitive disabilities, as well as medical conditions related to pregnancy or parenting. Students with letters of accommodation should submit a letter to each faculty member at the beginning of the semester and discuss specific arrangements. Please contact the Office of Accessibility Services for questions related to access and accommodations: Erwin Hall 22, (585) 245- 5112, access@geneseo.edu, <https://www.geneseo.edu/accessibility-office>).

Use of AI and writing assignments

Technology changes almost as rapidly as microbes mutate! This is not a bad thing, but it's important to be aware of how it can impact learning, and there are significant potential academic dishonesty issues that can arise. Most of you are likely aware of the wildly popular AI program chatGPT. It's fascinating! However, I strongly recommend not using it for your coursework for several reasons: (1) if you don't complete assignments yourself, you are not learning. If you're not going to do the work, honestly it's a waste of your time to take this course; (2) chatGPT is not an expert in microbiology, and will likely be prone to errors in writing assignments. If you do use chatGPT to generate any text you must cite the program in your references or works cited

section. Assignments containing text written by chatGPT will not receive full credit compared to assignments that contain original work. Using AI-written work without citing it constitutes an academic dishonesty violation (see section below).

Academic Dishonesty & Plagiarism

Students are expected to adhere to the University's policy on academic dishonesty and plagiarism, located in the student handbook. Academic dishonesty and plagiarism have serious consequences, and if you're struggling in class, please ask for help rather than resort to academic dishonesty! Academic dishonesty will result in a zero on the assignment or exam. In addition, a report will be filed to the department chair and Dean of the College, and a record of academic dishonesty will be placed in the student's file at the Dean of Students Office.

Schedule for class dates and content covered, as well as the assigned readings, for the semester. Subject to change at instructor's discretion.

Date	Subject	Assigned Textbook Reading
(T) 08/27	Introduction to the course <i>Begin Module 1</i> Information - how do we make a cell?	-
(R) 08/29	Information - how do we make a cell, continued?	Ch 9.1-9.2 Ch 13.1-13.2
(T) 09/03	How does a cell copy and transmit information? Part 1: Replication	Ch 9.3
(R) 09/05	How does a cell copy and transmit information? Part 2: Cell Division (Mitosis, Meiosis, & Stem Cells)	Ch 2.3-2.4 Ch 3.2
(T) 09/10	How to convert DNA into other molecules (RNA, protein)	Ch 10
(R) 09/12	Gene Expression: How do we make only some of the DNA into RNA and/or protein? HW #1 due	Ch 11
(T) 09/17	Review session	-

(R) 09/19	EXAM 1	-
(T) 09/24	<i>Begin Module 2</i> Genetics of Development in Humans Semester Project Individual Portion Due	Ch 3.3-3.6
(R) 09/26	Simple Mendelian Genetics Part 1	Ch 4
(T) 10/01	Simple Mendelian Genetics Part 2	Ch 4
(R) 10/03	Extensions to Mendelian Genetics Part 1	Ch 5
(T) 10/08	Extensions to Mendelian Genetics Part 2 HW #2 due	Ch 5
(R) 10/10	Review Session	-
(T) 10/15	No classes - Fall Break	-
(R) 10/17	EXAM 2	-
(T) 10/22	<i>Begin Module 3</i> Genetics and Sex and Gender	Ch 6
(R) 10/24	Complex Traits Semester Project Draft due	Ch 7
(T) 10/29	Mutations and Cancer	Ch 12 Ch 20.1
(R) 10/31	Chromosomal Variation	Ch 13.3-13.5
(T) 11/05	Genetics of ancestry and race HW #3 due	-
(R) 11/07	Review Session	-

(T) 11/12	EXAM 3	-
(R) 11/14	<i>Begin Module 4</i> Population Genetics, part 1: allele frequencies in populations	Ch 15
(T) 11/19	Population Genetics, part 2: how do allele frequencies change over time?	Ch 16
(R) 11/21	Genome sequencing & personalized medicine part 1	Ch 14 Ch 9.4
(T) 11/26	Genome sequencing & personalized medicine part 2	Ch 14 Ch 9.4
(R) 11/28	No classes - Thanksgiving Break	-
(T) 12/03	Genetics and human behavior Final Semester Project due	Ch 8
(R) 12/05	Semester project showcase HW #4 due	-
Section 01 Wed 12/11	Exam 4 - Bailey 101, 12:00-2:30	-
Section 02 Tues 12/17	Exam 4 - Bailey 101, 12:00-2:30	-