



BIOL 3250: GENETICS
Section 001
MWF 9:10-10:05
Spring 2015 Syllabus

Instructor Contact Information

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Office Hours

MWF 10:05-11:00 AM, or by appointment

Course Description

This course provides a general overview of the major fields of genetics, including transmission genetics, molecular genetics, and population and evolutionary genetics. We will emphasize problem-solving over rote memorization and fact regurgitation.

Course Objectives

Through a focus on problem-solving, our goals are to:

1. reinforce core concepts in general Genetics
2. improve critical thinking skills through text analysis
3. increase confidence and independence with respect to decision-making and computational analysis

Course Competency Targets

The following list summarizes the key competencies that we will pursue in this class. These are concepts that you should be familiar with by the end of term, such that you could explain each of them to someone who has not yet had a course in genetics.

1. Analyze phenotypic data and deduce patterns of inheritance from family histories
2. Describe the molecular anatomy of genes and genomes
3. Describe the mechanisms by which an organism's genome is passed on to the next generation
4. Describe the phenomenon of linkage and how it affects assortment of alleles during meiosis
5. Extract information about genes, alleles, and gene functions by analyzing the progeny from genetic crosses
6. Describe the processes that can affect the frequency of phenotypes in a population over time
7. Compare different types of mutations and describe how each can affect genes and the corresponding mRNAs and proteins
8. Apply the results of molecular genetic studies in model organisms to understanding aspects of human genetics and genetic diseases

9. Interpret results from molecular analyses to determine the inheritance patterns and identities of human genes that can mutate to cause disease

Course Materials

Course Website

All course materials will be provided online through **D2L** (<https://elearn.mtsu.edu>) or as handouts in class. It is your responsible to print out and **bring assigned problem sets to class**. We spend a great deal of time working problems during the lecture period.

Text

I do not require a textbook. Instead, I will refer you to an extremely useful web resource called **Scitable by natureEducation** (<http://www.nature.com/scitable>). The site includes an online library of Genetics content, as well material for Cell Biology and Ecology. I will provide links to specific content areas on D2L as suggested background reading as we progress through the semester.

Alternatively, you may choose to purchase the following text, either as a hardcopy or an ebook:

Brooker, Robert (2014) **Genetics: Analysis and Principles, 5th Edition**. McGraw-Hill Publishers.

Clickers

Clickers are required. You will need an **i>Clicker2 or i>Clicker+ Response System**. This item may be purchased through the campus bookstore, amazon.com, or the company website (<https://www1.iclicker.com/purchase/>). **Bring your clicker to class everyday beginning Monday, 4 February**. Your grade will depend on it.

Calculator

Due to the emphasis on problem-solving in this class, you should **bring a calculator to class everyday**. It is your responsibility to ensure that you have fresh batteries on exam days. You will not be allowed to use your phone in place of a traditional calculator, nor will you be allowed to use a calculator with internet capability.

Grading Policies

Your final course grade is a combination of lecture (75%) and lab (25%). Your lab instructor will outline the requirements and expectations for your individual lab section. **All grades will be posted in the D2L gradebook online**. If you have questions regarding your grade, you must discuss them with me in person. I will not discuss grades by email or phone, nor will I discuss your grades with anyone else or release graded items to anyone else. **I will not calculate your course average unless you believe there is an error in your grade as it appears on D2L**.

Your lecture grade will be determined by the following components:

Graded Item	Points per Item	Number of Items	Total Points	% of Total
Daily Clicker Questions		-	-	see below
Problem-solving Quizzes	5	6	30	16.7
Exams	50	3	150	83.3
Total Points Possible			180	

Grading Scale: I do not use a plus / minus grading scale. The following grading scale will apply to your final grade:

A = 90%-100% B = 80%-89% C = 70%-79% D = 60%-69% F ≤ 59%

Policy on Borderline Grades: Final grades are rounded to the nearest whole number (e.g., 89.44 = 89, while 89.50 = 90). A borderline grade, such as an 89, will remain a B. I will not round up to improve letter grades. The grade you earn is the grade you will receive.

What to expect for graded items: Refer to the summaries below for expectations on format and grading of individual graded items outlined in the table above.

Daily Clicker Questions: Clickers will be used to assess student understanding of material during each class period. You will not be graded on right or wrong answers, but instead on participation. We will not necessarily use clickers everyday, but we will use them with frequency. **Your participation in 75% or more of the daily clicker sessions will ensure a boost of two percentage points on your final grade.** Clicker sessions will not be announced in advance and cannot be made up.

Quizzes: There will be seven scheduled quizzes (see lecture schedule for dates). The lowest quiz will be dropped at the end of the semester, such that the total number of quizzes calculated into your final grade will be six. A missed quiz will automatically count as the drop quiz. Each quiz is worth 5 points: 2.5 points for a correct answer, and 2.5 points for showing the correct work, such that earned grades may be 0/5, 2.5/5, or 5/5. Each quiz will consist of a problem similar in format to the practice problems from class and the exams. Quizzes begin promptly at the beginning of the lecture period, and they are timed at 10 minutes. If you arrive late, you must complete the quiz within the same period as the rest of the class. If you miss the quiz, you will receive a zero.

Exams: There will be three exams, each worth 50 points. Each exam will consist of five, 10-point problems similar in format to problem-solving quizzes. Each exam after the first one is cumulative and will include at least one problem based on material covered on

previous exams. Examples of old exams are available on D2L, but keys will not be provided for these exams.

Final Exam: The Final Exam is worth 50 points and will be formatted exactly as all other exams. It is cumulative, meaning that each of the five problems will represent material covered on a previous exam. **The Final Exam is optional, and it will automatically replace your single lowest exam grade.**

Three important notes:

- 1) The optional Final Exam only replaces an existing exam grade; if you did not take one of the three regular exams, the Final Exam cannot be used to replace the missed exam.
- 2) If you choose to take the optional Final Exam and make a lower grade than on your existing lowest regular exam, the grade on the Final Exam still replaces the lowest existing grade.
- 3) Our Final Exam is scheduled for Wednesday, 6 May, 10:00 AM-12:00 PM.

Other Academic Policies

Below you will find my stance on attendance, make-up opportunities, academic dishonesty, and personal responsibility. As a student enrolled in this course, you are responsible for understanding and abiding by these policies.

Attendance: While not required, attendance is strongly recommended. Quiz and exam material will come directly from active problem-solving in class. Failure to attend lecture on a regular basis has historically lead to poor final grades in my class.

Make-up Policy: If you miss a quiz or an exam due to an excused absence, you will be allowed to take a make-up or the instructor may provide an alternative option. **Make-up quizzes and exams must be completed before the next class period.** If you are unable to take the make-up within this timeframe, you must see your instructor for other arrangements or negate the opportunity for a make-up. Quizzes or exams missed due to unexcused absences cannot be made up under any circumstances. If you know that you will be absent on a testing date, see your instructor about your options.

Excused / Unexcused Absences: As indicated in the MTSU Student Handbook (p22), University sanctioned activities are considered excused absences, and students will not be penalized for these absences. For any such absence, you will be required to provide me with a copy of the letter that excuses you from class. If you fail to do this prior to a missed exam, you will negate your opportunity for a make up. Also as indicated in the MTSU Student Handbook (p22), 'it is the responsibility of faculty members to excuse or refuse to excuse absences from their classes'. I consider the following to be examples of excusable absences in my class: illness under treatment of a healthcare provider (must supply official note from provider), serious illness of an individual under your care (must supply official

note from provider), death of a close friend or family member (must provide an obituary that names you among the bereaved or a letter from a member of the clergy or other reliable source confirming your relationship to the deceased), car accident (must supply a copy of the police report with date and time, hospital admission papers, etc.), military duty (must provide evidence of orders calling you away from class), or severe weather (must provide evidence that your route to campus is affected).

I consider the following to be unexcused absences in my class: traffic jams (unless there is a newsworthy accident that has impacted many people, in which case you must provide the news article and proof of your travel route), oversleeping, optional medical appointments unrelated to immediate illness, standardized tests for professional school (GRE, LSAT, MCAT, PCAT, etc.), studying or making up an exam or other work for another course, personal travel not related to any of the excused absences outlined above, and of course, just because you didn't feel like it. As the instructor of this class, the choice to accept any excuse and provide an opportunity to make up a missed exam is entirely at my discretion.

Disruptive Behavior: You are expected to be seated and ready for active participation in lecture no later than the scheduled start time. Being consistently late to class is disruptive for myself and other students, and it shows a lack of respect for all of us. If you arrive after I have started class more than once, I will bring the issue to your attention. If this behavior continues, I will ask to not return to class until you can arrive on time. Other disruptive and disrespectful behaviors during the class period could result in your removal from the classroom. Such behaviors include: sleeping, conversation extraneous to lecture, texting or other handheld device use extraneous to lecture, verbal or physical outbursts towards me or other students, and other behaviors that I determine are generally rude or disrespectful towards me or other students. **Tobacco products of any kind are not allowed in the classroom.** Electronic cigarettes or other forms of non-tobacco cigarettes are also prohibited.

Academic Dishonesty: I take a strong stance on cheating of any form. You are responsible for reading the **Policy Statement on Academic Misconduct** provided on the first day of class and posted on our D2L site. This document outlines the procedures that I will follow in the event of academic misconduct.

To avoid any misunderstandings, you are not allowed to have an internet-capable device in your hand or on your desk during a Quiz or Exam. This means no mobile phones, tablets, laptops, or even certain calculators, should be observed in your possession during an exam. If you are seen using any of these devices during an exam, it will be grounds for immediate dismissal from the room.

Personal Responsibility: As a student enrolled in this course, you are acknowledging that you have read this syllabus, and you acknowledge and abide by all policies stated herein.

As a student at MTSU, you are also acknowledging that you have read the MTSU Student Handbook, and that you acknowledge and abide by all policies stated therein. Failure to abide by all mentioned policies could have a negative impact on your grade in this class, or could potentially result in your removal from this class.

Disabled Student Services

Students who have a disability and who may require assistance or accommodation or students who have questions related to any services are encouraged to contact the Disabled Student Services office. Disabled Student Services is located on the first floor of the Keathley University Center in Room 120. For more information: Mr. John Harris, KUC 120, 898-2783.

Do you have a lottery scholarship?

To retain Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. You may qualify with a 2.75 cumulative GPA after 72 attempted hours (and subsequent semesters), if you are enrolled full-time and maintain a semester GPA of at least 3.0. A grade of C, D, F, or I in this class may negatively impact TELS eligibility. Dropping a class after 14 days may also impact eligibility; if you withdraw from this class and it results in an enrollment status of less than full time, you may lose eligibility for your lottery scholarship. Lottery recipients are eligible to receive the scholarship for a maximum of five years from the date of initial enrollment, or until a bachelor degree is earned. For additional Lottery rules, please refer to your Lottery Statement of Understanding form, review lottery requirements on the web at http://www.mtsu.edu/scholarships/telsconteligibility_scholarships.php, or contact the Financial Aid Office at 898-2830.

LECTURE SCHEDULE

Please note that Exam dates will NOT change except in the event of university closings or other emergent situation. However, content covered on a given date may change. It is your responsibility to attend class and confirm what material is actually covered throughout the semester.

<i>Week 1</i> Wed 21 Jan Fri 23 Jan	Course overview / syllabus Mitosis and meiosis	Brooker CH3
<i>Week 2</i> Mon 26 Jan Wed 28 Jan Fri 30 Jan	Mitosis and meiosis con't Mendelian inheritance QUIZ 1 / Mendelian inheritance con't	Brooker CH2
<i>Week 3</i> Mon 2 Feb Wed 4 Feb Fri 6 Feb	Probability and statistics Extensions of Mendel QUIZ 2 / Epistasis	Brooker CH2 Brooker CH4 Brooker CH4
<i>Week 4</i> Mon 9 Feb Wed 11 Feb Fri 13 Feb	Sex-linked, sex-influenced, and sex-limited Dosage compensation QUIZ 3 / Extranuclear inheritance	Brooker CH4 Brooker CH5 Brooker CH5
<i>Week 5</i> Mon 16 Feb Wed 18 Feb Fri 20 Feb	Human pedigrees Review / Practice problems EXAM 1	Brooker CH2
<i>Week 6</i> Mon 23 Feb Wed 25 Feb Fri 27 Feb	Return and review Exam 1 Genetic linkage Genetic linkage con't	Brooker CH6
<i>Week 7</i> Mon 2 Mar Wed 4 Mar Fri 6 Mar	Variation in chromosome structure & number DNA & RNA QUIZ 4 / DNA replication	Brooker CH8 Brooker CH9 Brooker CH11
<i>Week 8</i> Mon-Fri 9-13 Mar	SPRING BREAK - NO CLASSES	
<i>Week 9</i> Mon 16 Mar Wed 18 Mar Fri 20 Mar	Transcription and translation Gene regulation in eukaryotes QUIZ 5 / Epigenetics	Brooker CH12-13 Brooker CH15 Brooker CH16
<i>Week 10</i> Mon 23 Mar Wed 25 Mar Fri 27 Mar	<i>Ghost in your genes</i> - Documentary / discussion Review / Practice problems EXAM 2	

<i>Week 11</i> Mon 30 Mar Wed 1 Apr Fri 3 Apr	Return and review Exam 2 Guest speaker Guest speaker	
<i>Week 12</i> Mon 6 Apr Wed 8 Apr Fri 10 Apr	Developmental genetics Population genetics QUIZ 6 / Population genetics con't	Brooker CH25 Brooker CH26
<i>Week 13</i> Mon 13 Apr Wed 15 Apr Fri 17 Apr	Quantitative genetics Quantitative genetics con't QUIZ 7 / Evolutionary genetics	Brooker CH27 Brooker CH28
<i>Week 14</i> Mon 20 Apr Wed 22 Apr Fri 24 Apr	Evolutionary genetics con't Review / Practice problems EXAM 3	
<i>Week 15</i> Mon 27 Apr Wed 29 Apr	Return and review Exam 3 Open review session for Final Exam	
FINAL EXAM	Wednesday, 6 May	10 AM - 12 PM