

Biology 210: Principles of Genetics

Section 2

Fall 2016 Class Syllabus

Course and Instructor Information

Meeting times: Lecture: T,R,F 2:00 pm – 2:50 TNR 120
 Final Exam: Friday, December 16 10:15 – 12:15

Professor: Dr. Matt Rogge

Office hours: M, W 3:00 – 4:00

Office: TNR 435

Other times by appointment

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Course Description Genetics is the study of how physical traits are inherited and the chemical structures that influence those traits. Genetics is becoming increasingly important in all biological fields. It is important that students in these fields have a fundamental understanding of how traits are determined and passed to the next generation, as it is likely that they will encounter this at some point in their career. In this class, we will study DNA as the genetic material of all organisms, how it is replicated and transferred, how it controls physical traits of organisms, and how changes in the DNA sequence result in variability within populations.

Course objective Describe the basic principles of inheritance at the molecular, cellular, organismal, and population levels.

General learning outcomes

1. Explain the basic principles of how genetic material is arranged and transmitted
2. Describe how a change in genetic material influences function
3. Apply knowledge of genetic material to its manipulation
4. Relate population genetics to evolution
5. Articulate the importance of genetics to societal, medical, and personal issues

What you should acquire from this class

Students will understand that...

- The physical and physiological traits exhibited by an organism are a product of the genetic information found within the organism
- Genetic information is passed from parent to offspring, and the inherited traits can be predicted
- The genetic information can change, leading to modified physical or physiological traits, which is the basis for variation, adaptation, and evolution

Course Learning outcomes

Knowledge:

Students will...

- Describe the central dogma of molecular biology
- Describe the chemical and structural characteristics of DNA, RNA, proteins, and chromosomes
- Explain how genetic information changes, leading to variation within a population and adaptation and evolution of a species
- Explain similarities and differences in mitosis and meiosis
- Describe how traits are passed from parents to offspring

Skills:

Students will...

- Identify important sequences related to gene expression
- Determine the amino acid sequence of a protein from its DNA sequence
- Demonstrate the ability to predict the outcomes of genetic crosses
- Use the Hardy-Weinberg equation to determine genotype frequencies in a population

Dispositions:

Students will...

- Recognize the relatively simple nature of the genetic code, and how changes over time can lead to complex organisms
- Critically analyze the advantages and disadvantages of genetic manipulation
- Appreciate that physical variation observed in the members of a population is attributed to subtle differences in the individuals' genetic makeup

Required Texts

Brooker, R. J. Genetics: Analysis and Principles, 5th edition. McGraw-Hill, New York, New York. Available from text rental.

Attendance

Attendance in lecture is required to ensure exposure to all material covered in class, but no formal attendance will be taken. Attendance at exams is **REQUIRED**. Make-up exams will only be administered in the event of illness or emergency, which will also require documentation. If you are aware ahead of time of a conflict with an exam period, a meeting with the professor is required to discuss the situation, and rescheduling may occur at the **PROFESSOR'S** discretion.

Grading

Exams: 300 pts

There will be four exams during the semester (50 points each) and one during finals week (100 points). The material throughout the semester builds upon itself, so each exam will have **cumulative** ideas related to material covered on previous exams. In other words, view the semester continuously, not as five units broken up by exams. **Prepare accordingly.** The exams will be short answer, diagramming, multiple choice, fill in the blank, and matching. The only acceptable excuses for missing an exam are a death in the family, violent illness, or accident, and written evidence of some kind will be required in order to make up a missed exam. **NO EXCEPTIONS.** If a makeup exam is allowed, the makeup exam format may differ from the original exam. If you have a conflict with the night exam, see me **at least a week before** the scheduled exam to schedule an alternate time. If you do not inform me at least a week in advance, you risk not being able to schedule an alternate time.

Total Class Points: 300

If you feel an error has been made in grading, you have 48 hours from the time you receive the graded assignment to contact the professor with your reasoning. The student will meet with the professor to discuss the grading, and the exam will be re-graded and returned.

Grades will be calculated by dividing the total points received by the total points possible and multiplied by 100. The following scale will be used to assign a final grade.

93 to 100%	A	80 to 82%	B-	67 to 69%	D+
90 to 92%	A-	77 to 79%	C+	60 to 66%	D
87 to 89%	B+	73 to 76%	C	<60%	F
83 to 86%	B	70 to 72%	C-		

Tutoring

A tutoring group has been set up for this section of Biol 210 through the UWSP TLC. A schedule can be found on the TLC website <http://www.uwsp.edu/tlc>.

Expectations

You are responsible for attending lecture in order to ensure exposure to all the material covered. You are responsible for asking questions for clarification of topics that you do not fully understand. I am more than willing and happy to meet with you outside of class to further explain any topics. You can stop by during office hours or call/email/see me after class to set up an appointment outside of office hours. If there is any way I can assist you in this class, do not hesitate to ask, and I will do my best to help.

During class, you are responsible for taking appropriate notes of the lecture material. You are not allowed to record my lectures in any other way (voice recorder, video camera, photos of slides, etc.) without my prior consent.

UWSP values a safe, honest, respectful, and inviting learning environment. In order to ensure that each student has the opportunity to succeed, we have developed a set of expectations for all students and instructors. This set of expectations is known as the *Rights and Responsibilities* document, and it is intended to help establish a positive living and learning environment at UWSP. Visit here for more information:

<http://www.uwsp.edu/stuaffairs/Pages/rightsandresponsibilities.aspx>

Academic integrity is central to the mission of higher education in general and UWSP in particular. Academic dishonesty (cheating, plagiarism, etc.) is taken very seriously. Don't do it! The minimum penalty for a violation of academic integrity is a failure (zero) for the assignment. For more information, see the UWSP "Student Academic Standards and Disciplinary Procedures" section of the *Rights and Responsibilities* document, Chapter 14, which can be accessed here:

<http://www.uwsp.edu/stuaffairs/Documents/RightsRespons/SRR-2010/rightsChap14.pdf>

How to be successful in this class

- Show up for all scheduled lectures
- Look at the material you anticipate will be covered in class *before* you arrive to class
- Develop good note-taking skills. Do not try to write down everything that is said. Sort through the information and make note of the important ideas and concepts being discussed.
- Reading and processing the information is the first step in learning the information. Learn to take notes with abbreviations so that you can spend enough time listening in addition to writing. Leave space in your notes so that you can go back and fill in more details later on.
- Be engaged in class. Process the information and put it in your own words. Answer questions when asked, even if you answer it in your head. If your answer is incorrect or lacking, make notes as to why.
- Do not study *for exams*. Studying that way promotes memorization, not understanding. Instead, study for learning and understanding.
- Do not try to memorize definitions. I will never ask you to define something. You will, however, need to know what words mean in order to understand the questions I am asking on quizzes and exams.

- Study frequently. Repetition is the key to learning *any* topic. Studying for 40 hours over the span of four weeks will be much more beneficial than studying for 40 hours the weekend before the exam.
- After you have studied and know some or most of the material, meet with other students in the class and actively *discuss* the information. Explain mechanisms, theories, concepts, etc to other students. The other students can help you fill in areas where you are deficient. You will find that explaining these things to someone else is one of the best ways to ensure you know and understand the information. Then have another student explain a different idea or concept, and help them identify areas in which they are deficient.
- Study your notes beginning with “big picture” ideas. Find the bigger concepts and make sure you have a basic understanding of those ideas. Once those bigger concepts are understood, add additional details relating to those ideas. By doing this, you construct “compartments” in your mind to store the details rather than simply trying to absorb all the details and hoping that they arrange themselves into a coherent idea in your mind.
- When you do not understand something, LOOK IN THE TEXTBOOK! The book can give more detailed explanations and images that may help you better understand the material. Alternatively, use the internet. You have a wealth of information at your fingertips, use it!
- When your notes do not make sense and the book does not help, schedule an appointment with me. I am here to help you learn. I do not expect you to be a geneticist *before* taking the class. I understand that much of this material is new to you, and one or two lectures may not be enough for you to fully grasp the concepts. Do not be too stubborn to ask for help or you will risk falling behind.

Access for all Students

The Americans with Disabilities Act (ADA) is a federal law requiring educational institutions to provide reasonable accommodations for students with disabilities. For more information about UWSP’s policies, visit:

<http://www.uwsp.edu/stuaffairs/Documents/RightsRespons/ADA/rightsADAPolicyInfo.pdf>

If you have a disability and require classroom and/or exam accommodations, please register with the Disability and Assistive Technology Center and then contact me **AT THE BEGINNING OF THE COURSE**. I am happy to help in any way that I can, but you need to be registered. For more information, please visit the Disability and Assistive Technology Center, located on the 6th floor of the Learning Resource Center (the Library). You can also find more information here:

<http://www4.uwsp.edu/special/disability/>

Use of electronics during class

Please turn off/mute/set to vibrate any electronic devices that could interrupt class (lab or lecture) before class begins. If it is a personal emergency, feel free to excuse yourself from the class and communicate outside of the classroom. I do not allow the use of electronics to record my lectures (visual or audio) without prior approval. If I find that lectures or labs are being inappropriately recorded, your final grade will be dropped one full letter.

TENTATIVE SCHEDULE (Subject to change)

Week	Date	Topic	Chapter
1	Sept 6	Syllabus and Intro to Genetics	1
	Sept 8	DNA Structure	9
	Sept 9	DNA Structure	9
2	Sept 13	Chromosome Organization	10
	Sept 15	DNA Replication	11
	Sept 16	DNA Replication	11
3	Sept 20	Transcription	12
	Sept 22	Transcription	12
	Sept 23	Translation	13
4	Sept 27	Exam 1 (through transcription)	
	Sept 29	Translation	13
	Sept 30	Regulation of Prokaryotic Genes	14
5	Oct 4	Regulation of Prokaryotic Genes	14
	Oct 6	Regulation of Eukaryotic Genes	15/16
	Oct 7	DNA Mutation and Repair	18
6	Oct 11	DNA Mutation and DNA Repair	18
	Oct 13	DNA Recombination	19
	Oct 14	DNA Recombination	19
7	Oct 18	Exam 2 (through mutation and repair)	
	Oct 20	Mitosis and Meiosis	3
	Oct 21	Mitosis and Meiosis	3
8	Oct 25	Mitosis and Meiosis	3
	Oct 27	Chromosome Structure and Number	8
	Oct 28	Chromosome Structure and Number	8
9	Nov 1	Mendelian Inheritance	2
	Nov 3	Mendelian Inheritance	2
	Nov 4	Mendelian Inheritance and Chi Square	2
10	Nov 8	Exam 3 (through chromosome structure and number)	
	Nov 10	Inheritance Patterns and Sex-Linked Traits	4
	Nov 11	Inheritance Patterns and Sex-Linked Traits	4
11	Nov 15	Non-Mendelian Inheritance	5
	Nov 17	Non-Mendelian Inheritance	5
	Nov 18	Genetic Linkage	6
12	Nov 22	Genetic Linkage	6
	Nov 24	Thanksgiving Break – No class	
	Nov 25	Thanksgiving Break – No class	
13	Nov 29	Recombinant DNA Technology	20
	Dec 1	Recombinant DNA Technology	20
	Dec 2	Exam 4 (through linkage)	
14	Dec 6	Biotechnology	21
	Dec 8	Biotechnology	21
	Dec 9	Genetics of Cancer	24
15	Dec 13	Population Genetics	26
	Dec 15	Population Genetics	26
	Dec 16	Final Exam (10:15-12:15, TNR 120)	