

## BIOL 210-01 Principles of Genetics

Fall 2020 — Online / Asynchronous

Instructor:	Dr. Daniel L. Graf	Course web	Canvas site at
Office:	TNR 435	site:	<a href="https://www.uwsp.edu/canvas/">https://www.uwsp.edu/canvas/</a>
Phone:	715.346.2285	Zoom/Office	Mo We Fr 11AM – noon
email:	<a href="mailto:dgraf@uwsp.edu">dgraf@uwsp.edu</a> (include “BIOL 210” in subject)	Hours:	and by appointment

**General Course Description.** “Structure of genes and mechanisms of genetic inheritance. Relationships of nucleic acids and proteins to expression of genetic information. Quantitative analysis of genetic crosses, gene mapping, and population and evolutionary genetics.”

**Objectives.** The objectives of BIOL 210 are 1) to examine general principles biological inheritance, and 2) to provide the foundation necessary for success in future coursework.

*Learning Outcomes.* Upon completion of BIOL 210, students will be able to:

1. Explain molecular, cellular, and environmental processes that influence biological inheritance.
2. Describe the structures, physical arrangements, and interactions of nucleic acids, genes, and genomes in biological systems.
3. Recognize the cellular machinery responsible for DNA replication, transcription, translation, and the regulation of gene expression.
4. Apply quantitative reasoning to describe genetic crosses, genetic mapping, and population genetics.

**Prerequisites.** Course in Introductory Biology (BIOL 101 or BIOL 111 or BIOL 130 or BIOL 160) and introductory chemistry (CHEM 105 or CHEM 117).

**Required Materials.** *Genetics: Genes, Genomes, and Evolution* (2017), by Meneely, Hoang, Okeke, & Heston. Oxford University Press, Oxford (ISBN 978-0-19-879536-0). This book is available for rent at the bookstore.

Access to a computer connected to the Internet. You will need to be able to access Canvas through a browser. On campus, computers are available to use in Albertson LRC and multiple computer labs. The following URL has a handy directory of campus computer labs:

<https://www.uwsp.edu/infotech/Pages/ComputerLabs/All-Labs.aspx>

**COURSE ORGANIZATION.** The organizing plan for this semester will be to

1. try, as much as is reasonable, possible, and helpful to support the structure of the typical face-to-face version of the course, while
2. maintaining as much flexibility as possible.

All due dates for problems, quizzes, and exams will provide a wide window of time for completion, and there is nothing for this course that will require you to do something at a specific, scheduled time. However, we will be expecting to keep to a schedule to offer the structure and pacing of an in-person course. This will include honoring all holidays.

## BIOL 210 Principles of Genetics

**Lectures, Quizzes, and Exams.** There will be a total of 360 possible points to earn this semester through lecture quizzes, weekly quizzes, two problem sets, three midterm exams, and a comprehensive final exam. Everything will be administered through Canvas.

	<b>points</b>
Midterm Exam 1	50
Midterm Exam 2	50
Midterm Exam 3	50
Lecture Quizzes	40
Weekly Quizzes	60
Problem Sets	10
Final Exam	100
<b>TOTAL</b>	<b>360</b>

*Lecture Quizzes.* — The course schedule is attached. Overall, the plan will be for the equivalent of 3 lectures (with reading assignments) per week, arranged according to a typical Monday-Wednesday-Friday schedule. Associated with each lecture will be a 1-point quiz (40 total points; 11% of your total grade). To receive credit, each lecture quiz must be completed in Canvas before the next one is assigned (e.g., a Monday quiz should be completed before Wednesday). All lecture quizzes will have a 5-minute time limit.

*Weekly Quizzes.* — Each Thursday, there will be a 5-point weekly quiz covering the three previous lectures (and associated readings). Those weekly quizzes will be due by midnight on Friday of each week. Your lowest quiz score of the semester will be dropped (60 points; 17%). All weekly quizzes will have a 15-minute time limit.

*Problem Sets.* — Twice during the semester, we will have problem sets associated with some of the quantitative aspects of genetics. These are worth 5 points each (10 points; 3%). You are encouraged to safely collaborate with your classmates on these problems, and Prof. Graf will help coordinate the arrangement of group work. The due dates for the problem sets are on the course schedule.

*Midterm Exams.* — Every 4-5 weeks (10 lectures), we will have a 50-point exam that covers the material since the previous lecture. All midterm exams will take place on Mondays (5 October, 2 November, and 30 November; 150 points; 41%), and those exams will be available to take for 24-hours (7 AM Monday until 7 AM Tuesday). All three midterm exams will have a 1-hour time limit.

*Final Exam.* — There will be a 100-point (28%) comprehensive final exam during the regularly scheduled final exam week. We do not have an assigned final exam time because ours is an asynchronous course (i.e., no scheduled meeting times), but we will determine our final exam session early in the semester. The final exam will have a 2-hour time limit, offered during a single 24-hour period.

Grades will be based upon the following percentages of the course total:

	100-93%	A	92-89%	A-	
88-87%	B+	86-83%	B	82-79%	B-
78-77%	C+	76-73%	C	72-69%	C-
68-67%	D+	66-59%	D	<59%	F

**REQUESTS FOR EXTRA POINTS WILL NOT BE HONORED.**

**Exam and Quiz Rules.** The following rules apply to lecture quizzes, weekly quizzes, and exams:

1. All quizzes and exams will be “open-note,” meaning you may use your reading and lecture notes to help you answer the questions. You may not use your textbook, the Internet, or other sources while you are taking a quiz or an exam. If you want access to the information in those sources, then commit them to your notebook ahead of time. All that being said, we will be completely on the honor system. No one will be watching you work.
2. You may also use a calculator and scratch paper during quizzes and exams.
3. All quizzes and exams will have a time limit. If you need to look up every answer in your notes, you may not finish, and you will forfeit the points.
4. Using other sources besides your notes will be regarded as academic misconduct. According to our UW System rules, to take away even a single point for such a violation requires the involvement of the Dean of Students.
5. Collaborating on a quiz or exam with other students in the class is also academic misconduct. People will be taking quizzes and exams at different times. You should not discuss them or share information with anyone until the due date has passed.

Prof. Graf has been around the block a few times, and he has a lot of experience distinguishing inadvertent or naive mistakes from intentional plagiarism. As long as you don't make it an issue, it won't be an issue. More information about the regulations associated with academic misconduct can be found at the following URL:

<https://www.uwsp.edu/dos/Pages/stu-academic.aspx>

**Online Attendance and Making-Up Missing Work.** Our online format offers a lot of flexibility, but this course is designed for enrolled students making progress toward their degrees. The schedule of lectures, quizzes, and exams is intended to keep you on-track.

However, there are good reasons for not being able to participate within the scheduled timeframe: too sick to operate a computer, power outage, religious observances, and others. If you require an accommodation for such a situation, you should contact Prof. Graf ahead of time to discuss alternative arrangements.

**Zoom Conduct.** Student and instructor behavior should promote an environment favorable to both teaching and learning. Students that choose to disrespect their classmates and their instructor by disrupting Zoom sessions will be asked to leave.

**Disabilities.** Students with disabilities are welcomed and encouraged in this class. Students with disabilities should contact the Disability and Assistive Technology Center during the first two weeks of the semester if they wish to request specific accommodations.

<https://www.uwsp.edu/datc/Pages/default.aspx>

## BIOL 210-01 Principles of Genetics

week	date	Day #	Lecture	Chapter (pages)
1		0	Welcome to BIOL 210!	prologue (1-12)
	2-Sep	W	1 Evolution, Genomes, & Genetics	1.1-1.4 (13-25)
	4-Sep	F	2 Structure & Function of Genes	2.1-2.2 (28-42)
2	7-Sep	M	LABOR DAY — NO CLASS	
	9-Sep	W	3 The Central Dogma	2.3-2.6 (42-66)
	11-Sep	F	4 Evolution & Genome Variation	3.1 (72-87)
3	14-Sep	M	5 Genome Size & Organization ADD/DROP DEADLINE	3.2 (87-98)
	16-Sep	W	6 Genome Content & Biological Diversity	3.3-3.37 (103-123)
	18-Sep	F	7 DNA Replication	4.1-4.3 (129-153)
4	21-Sep	M	8 Mutation	4.4-4.6 (153-168)
	23-Sep	W	9 The Rules of Mendelian Inheritance	5.1-5.2 (189-197)
	25-Sep	F	10 Applying the Rules of Mendelian Inheritance	5.3-5.5 (197-210)
5	28-Sep	M	11 Catch-up, Synthesis, & Review (Lectures 1-10)	
	30-Sep	W	12 Mitosis & the Cell Cycle	6.1-6.2 (219-229)
	2-Oct	F	13 Meiosis & Recombination	6.3 (229-246)
6	5-Oct	M	<b>E1 Exam 1 (Lectures 1-10)</b>	
	7-Oct	W	14 Gametogenesis, Fertilization & Meiosis	6.4-6.7 (246-259)
	9-Oct	F	15 Introduction to Problem Set 1	TBD
7	12-Oct	M	16 Sex Linkage	7.1-7.2 (264-274)
	14-Oct	W	17 X Chromosomes & Sex Determination	7.3-7.6 (274-299)
	16-Oct	F	18 Interactions Among Alleles & Genes <b>Problem Set 1 Due!</b>	8.1-8.3 (308-321)
8	19-Oct	M	19 Interactions Among Genes & the Environment	8.4-8.7 (321-334)
	21-Oct	W	20 Linkage	9.1-9.2 (341-359)
	23-Oct	F	21 Genetic Maps	9.3-9.5 (359-376)
9	26-Oct	M	22 Catch-up, Synthesis, & Review (Lectures 12-21)	
	28-Oct	W	23 Mapping Human Genes	10.1-10.4 (383-401)
	30-Oct	F	24 Complex Traits	10.5-10.8 (401-413)
10	2-Nov	M	<b>E2 Exam 2 (Lectures 12-21)</b>	
	4-Nov	W	25 Transformation, Conjugation & Transduction	11.1-11.4 (419-441)
	6-Nov	F	26 Effects of Horizontal Gene Transfer WITHDRAWAL DEADLINE	11.5-11.8 (441-459)
11	9-Nov	M	27 Initiation of Transcription	12.1-12.2 (464-472), 12.4 (490-495)
	11-Nov	W	28 Regulation of Transcription Initiation	12.3 (472-490)
	13-Nov	F	29 Introduction to Problem Set 2	TBD
12	16-Nov	M	30 Elongation & Termination of Transcription	12.5-12.6 (495-511)
	18-Nov	W	31 Translation	13.1-13.3 (517-532)
	20-Nov	F	32 The Genetic Code <b>Problem Set 2 Due!</b>	13.4-13.6 (532-549)
13	23-Nov	M	33 Catch-up, Synthesis, & Review (Lectures 22-32)	
	25-Nov	W	34 Bacterial Operons	14.1-14.2 (555-576)
	27-Nov	F	THANKSGIVING — NO CLASS	
14	30-Nov	M	<b>E3 Exam 3 (Lectures 22-32)</b>	
	2-Dec	W	35 Eukaryotic Gene Regulation	14.3-14.4 (576-590)
	4-Dec	F	36 Population Genetics	16.1-16.2 (642-652)
15	7-Dec	M	37 Selection	16.5 (670-687)
	9-Dec	W	38 Other Factors Affecting Populations Genetics	16.3-16.4 (652-670), 16.6-16.7 (687-691)
	11-Dec	F	39 Course Synthesis & Review	
16	14-Dec to 18-Dec		FINALS WEEK	