

## BIOL 210-02 Principles of Genetics

Spring 2021

Lecture: Online Synchronous M W F noon – 12:50 PM

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:	715.346.2159 (Biology Office)	Zoom/	M W F 12 – 12:50 PM
email:	<a href="mailto:dgraf@uwsp.edu">dgraf@uwsp.edu</a> (include “BIOL 210” in subject)	Office 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 the Chrome browser. We will be using an online exam proctoring service called Honorlock in this course. You will be required to use Honorlock for exams in this course. Please see the *Honorlock – Student Information module* for additional resources on Canvas. You should take the Honorlock Practice Quiz to familiarize yourself with this process before the first graded exam.

On-campus, computers are available to use in Albertson LRC and various computer labs (although many are closed). The following URL has a directory of campus computer labs:

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

*Recommended Materials.* A dedicated BIOL 210 notebook.

**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 necessary.

This course is scheduled to have three synchronous Zoom hours per week to block-out those periods on your schedule. We will actually be observing four levels of synchrony in this course.

1. *Required Synchronous.* There will be four dates throughout the semester for the midterm exams and the final exam that will happen at scheduled times. See the attached schedule.

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2. *Enthusiastically Encouraged Synchronous.* Each Monday throughout the semester will be designated as a synchronous meeting to answer questions, review material, and get organized for the week. You are expected to virtually attend these sessions, but they carry no point value.
3. *Optional Synchronous.* Wednesday and Friday hours (when there isn't a scheduled exam) will be office hours. If you have questions, comments, issues, etc. with which you need help, you can get it without making an appointment. Otherwise, you can (and should!) make an appointment for a Zoom session outside those hours.
4. *Asynchronous.* All lectures, problem sets, quizzes, etc. not described above will be completed asynchronously.

**Lectures, Quizzes, and Exams.** There will be a total of 333 possible points to earn this semester through lecture quizzes, weekly quizzes, three problem sets, three midterm exams, and a comprehensive final exam. Everything will be administered through Canvas.

*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 (33 total points; 10% 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. (There will actually be 39 quizzes, so you could miss 6 and still get all the quiz points.)

	<b>points</b>
Midterm Exam 1	50
Midterm Exam 2	50
Midterm Exam 3	50
Lecture Quizzes	33
Weekly Quizzes	40
Problem Sets	10
<b>Final Exam</b>	<b>100</b>
<b>TOTAL</b>	<b>333</b>

*Weekly Quizzes.* — Each Friday (except when there is an exam), there will be a 5-point weekly quiz covering the lectures since the last weekly quiz or exam. Weekly quizzes will be due by midnight on the following Friday. Your two lowest weekly quiz scores of the semester will be dropped (40 points; 12%). All weekly quizzes will have a 15-minute time limit.

*Problem Sets.* — Three times during the semester, we will have problem sets associated with some of the quantitative aspects of genetics. These are worth 5 points each. Your lowest problem set score will be dropped (10 points; 3%). You are encouraged to safely collaborate with your classmates on these problems, and Prof. Graf can 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 exam. All midterm exams will take place on Fridays (26 February, 2 April, and 30 April; 150 points; 45%) from 12-12:50 PM. Midterm exams will have a 1-hour time limit.

*Final Exam.* — There will be a 100-point (30%) comprehensive final exam during the regularly scheduled final exam week. The final exam will have a 2-hour time limit, offered during the scheduled exam 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 lecture and weekly quizzes will be “open-note,” meaning you may use your lecture and reading notes to help you answer the questions. You may not use your textbook, the Internet, or other sources while you are taking a quiz. All that being said, we will be completely on the honor system. No one will be watching you work.
2. All exams will be “closed note.” You may not use your notes or any other materials (textbook, Internet, etc.) during any of the three midterm exams or the final exam. We will be using an online exam proctoring service called Honorlock in this course. You will be required to use Honorlock for exams in this course. There is a lot more information about Honorlock on the course Canvas site.
3. You may use a calculator (not a calculator app on your phone) and scratch paper during quizzes and exams. During exams, a calculator will be provided in using Honorlock.
4. All quizzes and exams will have a time limit.
5. Using unauthorized materials during quizzes or exams will be regarded as academic misconduct and will result in a 0 on the quiz or exam. 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.
6. Collaborating on a quiz or exam with other students in the class is also academic misconduct. Students may be taking quizzes and exams at different times. You should not discuss them or share information with anyone until the due date/time has passed.

Prof. Graf has a lot of experience distinguishing inadvertent or naive mistakes from intentional misconduct. 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 tri-weekly 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, university-related absences, instructor messed up the assignment settings, 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.

In order to foster a sense of community and engagement (both have been demonstrated to improve learning outcomes and course quality), everyone is encouraged to participate in class with their web camera on as much as possible and comfortable. No one will be required to use their camera during Zoom sessions, and not using your camera will have no effect on your grade or standing in the class.

**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>

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wk	date	day	#	Lecture	Chapter (pp.)
1	25-Jan	M	0	Welcome to BIOL 210!	
	27-Jan	W	1	Evolution, Genomes, & Genetics	1.1-1.4 (13-25)
	29-Jan	F	2	Structure & Function of DNA	2.1-2.2 (28-42)
2	1-Feb	M	3	The Central Dogma	2.3-2.6 (42-66)
	3-Feb	W	4	Evolution & Genome Variation	3.1 (72-87)
	5-Feb	F	5	Genome Size & Organization	3.2 (87-98)
3	8-Feb	M	6	Genome Content & Biological Diversity	3.3-3.5 (98-106)
	10-Feb	W	7	DNA Replication	4.1-4.3 (129-153)
	12-Feb	F	8	Mutation	4.4-4.6 (153-168)
4	15-Feb	M	9	The Rules of Mendelian Inheritance	5.1-5.2 (189-197)
	17-Feb	W	10	Applying the Rules of Mendelian Inheritance	5.3-5.5 (197-210)
	19-Feb	F	11	Catch-up, Synthesis, & Review (Lectures 1-10)	
5	22-Feb	M	12	Mitosis & the Cell Cycle	6.1-6.2 (219-229)
	24-Feb	W	13	Meiosis & Recombination	6.3 (229-246)
	26-Feb	F	<b>E1</b>	<b>Exam 1 (Lectures 1-11)</b>	
6	1-Mar	M	14	Gametogenesis, Fertilization & Meiosis	6.4-6.7 (246-259)
	3-Mar	W	15	Sex Linkage	7.1-7.2 (264-274)
	5-Mar	F	16	Introduction to Problem Set 1	
7	8-Mar	M	17	X Chromosomes & Sex Determination	7.3-7.6 (274-299)
	10-Mar	W	18	Interactions Among Alleles & Genes	8.1-8.3 (308-321)
	12-Mar	F	19	Interactions Among Genes & the Environment <i>Problem Set 1 Due!</i>	8.4-8.7 (321-334)
8	15-Mar	M	20	Linkage	9.1-9.2 (341-359)
	17-Mar	W	21	Genetic Maps	9.3-9.5 (359-376)
	19-Mar	F	22	Catch-up, Synthesis, & Review (Lectures 12-21)	
22-26-Mar		M-F	SPRING BREAK — NO CLASSES		
9	29-Mar	M	23	Mapping Human Genes	10.1-10.4 (383-401)
	31-Mar	W	24	Complex Traits	10.5-10.8 (401-413)
	2-Apr	F	<b>E2</b>	<b>Exam 2 (Lectures 12-22, Problem Set 1)</b>	
10	5-Apr	M	25	Transformation, Conjugation & Transduction	11.1-11.4 (419-441)
	7-Apr	W	26	Effects of Horizontal Gene Transfer	11.5-11.8 (441-459)
	9-Apr	F	27	Initiation of Transcription	12.1-12.2 (464-472), 12.4 (490-495)
11	12-Apr	M	28	Regulation of Transcription Initiation	12.3 (472-490)
	14-Apr	W	29	Elongation & Termination of Transcription	12.5-12.6 (495-511)
	16-Apr	F	30	Introduction to Problem Set 2	
12	19-Apr	M	31	Translation	13.1-13.3 (517-532)
	21-Apr	W	32	The Genetic Code	13.4-13.6 (532-549)
	23-Apr	F	33	Catch-up, Synthesis, & Review (Lectures 23-32) <i>Problem Set 2 Due!</i>	
13	26-Apr	M	34	Bacterial Operons	14.1-14.2 (555-576)
	28-Apr	W	35	Eukaryotic Gene Regulation	14.3-14.4 (576-590)
	30-Apr	F	<b>E3</b>	<b>Exam 3 (Lectures 23-33, Problem Set 2)</b>	
14	3-May	M	36	Population Genetics, Assign Problem Set 3	16.1-16.2 (642-652)
	5-May	W	37	Selection	16.5 (670-687)
	7-May	F	38	Other Factors Affecting Populations Genetics	16.3-16.4 (652-670), 16.6-16.7 (687-691)
15	10-May	M	39	Course Synthesis & Review	
	12-May	W	40	Study Day (no new material)	
	14-May	F	41	Last Review Session <i>Problem Set 3 Due!</i>	
16	20-May	Th	<b>FE</b>	<b>FINAL EXAM 8-10 AM</b>	

**Boldfaced items** are required synchronous events.