

BIOLOGY 210 - PRINCIPLES OF GENETICS

Section 02, Spring 2018 Course Syllabus

Instructor:

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Course Information:

Room 170, Trainer Natural Resources Building (TNR)

Monday, Wednesday, Friday; 12:00pm – 12:50pm

Course website – see D2L

Office hours: Monday 1-2pm, Wednesday 11am-12pm, Friday 1-2pm and by appointment

Required Materials:

Textbook - Brooker, R.J. 2015. *Genetics: Analysis & Principles*, 6th ed. Can be rented in the university bookstore.

Calculator – Simple calculator for exams (programmable/text-display calculators and phones not acceptable)

Course Objective:

The objective of this course is to understand the general principles of genetics that contribute to heredity and variation among organisms. Particular focus will be placed on the molecular basis of transmission, cytological, molecular and population genetics.

Learning Outcomes:

University Level: Investigation / Understanding the Physical World:

- 1) Infer relationships, make predictions and solving problems based on an analysis of evidence or scientific information.
- 2) Apply scientific concepts, quantitative techniques and methods to solving problems and making decisions.
- 3) Describe the relevance of some aspect of the natural science to their lives and society.

Biochemistry/Biology Program Level:

- 1) Apply the scientific method, using appropriate theoretical and practical skills to design research studies, answer biological questions and/or solve problems.
- 2) Describe the flow of genetic information, the chromosome theory of heredity, and the relationship between genetics and evolutionary theory.
- 3) Evaluate and discuss contemporary social and ethical issues related to biology.

Genetics Course Level:

- 1) Compare the basic principles of inheritance at the molecular, cellular and organismal levels, beyond the scope of an introductory course.
- 2) Compare relationships between molecule/cell level phenomena (modern/molecular genetics) and organism-level patterns of heredity (classical/transmission genetics).
- 3) Apply this knowledge in a variety of problem-solving situations.
- 4) Integrate knowledge of DNA with the concepts of cellular function, evolution and biotechnology.
- 5) Appraise ethical issues involved with the study of genetics, biotechnology and medicine.

Grading:

Grade Items	% of Course Grade
Exam I	15 %
Exam II	15 %
Exam III	15 %
Exam IV	15%
Exam V	(One dropped)
Comprehensive Final Exam	25 %
Take-home Assignments	15 %
Total	100 %

Grade Scale:

A ≥ 93%	B+ ≥ 87%	C+ ≥ 77%	D+ ≥ 67%	F ≤ 59%
	B ≥ 83%	C ≥ 73%	D ≥ 63%	
A- ≥ 90%	B- ≥ 80%	C- ≥ 70%	D- ≥ 60%	

Grades will be posted on D2L

Exams and Assignments:

There will be 5 Exams given during class lecture time, and 1 comprehensive Final. **All exams must be taken for a grade.** The lowest exam grade will be dropped from your average. The four highest exams will be worth 15% of the course grade each. The final exam will be comprehensive and is worth 25% of the course grade.

There will be three take-home assignments throughout the semester. These assignments will be posted on D2L and will be due on an exam day, indicated in the schedule on the last page of this syllabus. Each assignment will indicate if it can be completed in group work or should be completed individually.

Exams Study Guides:

Study guides including practice problems and suggested problems from your textbook will be posted on D2L before each exam. Although these problems will not be graded, **some may be used as questions on the exams.** In addition, you have the option to discuss the genetics problems during lecture, with the instructor during office hours or by appointment, and/or attend weekly tutoring sessions. Tutoring sessions are a great way to review as well as get help!

Attendance Policy:

- Attendance at all lectures is required. Any missed assignments cannot be made up without approved documentation for an excusable of absence.
- Excusable absences include illness, accident, family emergency, professional development activity, religious activity (see UWSP University Handbook Chapter 22), or university sanctioned event. Acceptable documentation is the instructor's discretion, but may be written or electronic documentation for the reason of absence. In the case you have an expected or unexpected absence, please contact the instructor **AS SOON AS POSSIBLE** to notify about the nature of the absence and determine if it can be excused.
- Late arrival to class will not be excused and any assignment or exam due during that class will not be granted a time extension.

Academic Conduct:

Do not copy the work of other students; Do not represent the work of other students as your own; Do not share your work with other students

You are responsible for the honest completion and representation of your work and for the respect of others' academic endeavors. Any action of cheating, plagiarism, or academic misconduct is subject to the penalties outlined in UWS University Community Rights and Responsibilities, Chapter 14. Please refer to the University Community Rights and Responsibilities rules and regulations for more information: <https://www.uwsp.edu/dos/Documents/CommunityRights.pdf#page=11>

Student assignments determined to be in violation of these policies will result in a grade of zero (0). Depending on the circumstance, students may receive further penalty in accordance with these policies.

Course Communication:

Information about this course will be communicated through D2L and/or sent to University email accounts. Students are responsible for/expected to check their University email regularly. If you use an email account other than your University account to contact the instructor, be sure your full name is included in the message!

Electronic Devices:

Cell phones should be turned **OFF** and **NOT BE USED** during class times. No other communication or musical devices are allowed. Students needing an electronic language dictionary during exams may use one with permission from the instructor (see below). No video or audio recording of lectures is permitted without the prior permission from the instructor (see below).

Students Seeking Assistance & Students Disabilities:

As the instructor, it is **my goal to meet the educational needs of ALL STUDENTS and to provide the best learning environment possible.**

Any student seeking/considering use of assistive technology, materials, or accommodations are encouraged to talk with the instructor at the beginning of the course. It is my goal to find the most effective way to teach all students. Students with a disability seeking accommodations should also register with the Disability and Assistive Technology Center (<https://www.uwsp.edu/disability/Pages/default.aspx>) in the Learning Resource Center (the Library).

Suggested study habits:

It is often observed that people learn more when they encounter and interact with subject material in different ways. The following scale presents representative measures of how we might learn through different forms of interaction.

You learn:
10% of what we **read**
20% of what we **hear**
30% of what we **see**
40% of what we **see & hear**
50% of what we **write**
60% of what is **discussed**
70% of what we **experience**, and
95% of what we **teach**

Before each class:

- a) Read the textbook chapters and summary sections that pertain to the info in the lecture slides (Powerpoint). While reading, take notes on the side of each slide to help clarify the information discussed in class. These notes can be used as lecture slide guide sheets.

Before the exam:

- a) **Rewrite your notes!** For each lecture, continue developing your lecture slide guide sheets and write out the information that was covered for each slide. Try to describe any images/figures on the slide in your own words. Try to do this for each lecture BEFORE the next lecture. Then read it over once to see the whole picture or overall theme of that lecture. When appropriate, make a table of info to help compare concepts.
- b) **Anticipate exam questions.** Come up with 1-2 questions of your own from each slide to quiz yourself later. Definitions, short answers, problems, and comparisons are all good types of questions.
- c) **Study your notes.** At the end of each week you will have made lecture slide guide sheets that include your notes for that material. Before the week's lectures, read over your lecture slide guide sheets and highlight only the information you could not remember.
- d) **Focus your studies.** Before the exam you will have made a set of lecture slide guide sheets with the information you need to reinforce already highlighted. Focus on this highlighted material one or two days before the exam. Reread, highlight info that you are having trouble learning or remembering and say it out loud, to yourself, with another person from class, a friend or study group.
- e) **Practice questions.** At the end of each chapter, try the practice questions (suggested on D2L) before looking at the answers in the back of the book. Write down the ones you do not understand and ask the instructor for guidance with those problems.
- f) **Revisit your study questions.** Try to answer the questions that you generated for each slide. Study with someone in class and try to answer each other's questions.
- g) **Teach your peers.** If you can teach it to another person, then you know it!

The night before the exam:

- a) **Value your sleep.** Being wakeful and well rested can help your performance on the exam. Be sure to get a good night's sleep before the exam. Cramming at the expense of sleep is not the best method.
- b) **Try to relax.** Study hard, but also seek ways to reduce your stress. Take breaks to help refocus your mind.

After the exam:

- a) A good grade can result from **reading** the text and your notes, **listening** to lectures, **seeing** the words and figures, **writing** and **rewriting** notes from class, the **experience** of answering questions from the chapters or provided, and **discussing** topics with another person (saying it out loud).
- b) Your grade should reflect the amount of cumulative effort you put into your studying. Remember, for every hour of lecture, you should a lot two hours of designated studying time. In other words, for each exam you should be spending about 10-15 hrs studying! It isn't possible to effectively achieve that right before an exam.

Week	Date	Topic	Chapter (Slides)	
1	January	22	Syllabus / Overview of Genetics	1
		24	DNA as Genetic Material	9
		26	Molecular Structure of DNA and RNA	9
2		29	Chromosome Organization and Structure	10
		31	DNA Replication	11
3		2	DNA Replication	11
		5	Gene Transcription in Prokaryotes	12
		7	Gene Transcription in Eukaryotes & RNA Modification	12
		9	Gene Transcription in Eukaryotes & RNA Modification	12
		12	EXAM I	(Chapters 1, 9, 10, 11)
4	February	14	Genetic Code	13
		16	Translation	13
		19	Translation	13
5		21	Gene Regulation in Prokaryotes	14
		23	Gene Regulation in Eukaryotes at DNA Level	15/16
6		26	Gene Regulation in Eukaryotes at RNA Level	15/16
		28	Gene Mutation	19
7		2	EXAM II (Take-Home Assignment #1 Due)	(Chapters 12, 13, 14, 15, 16)
		5	Gene Mutation	19
		7	DNA Repair	19
8	March	9	Transposable Elements & Viruses	18/20
		12	Mendelian Inheritance	2
		14	Mendelian Inheritance	2
9		16	Cell Division: Mitosis	3
		19	Cell Division: Meiosis	3
		21	Inheritance Patterns: Forms of Allele Expression	4
		23	EXAM III (Take-Home Assignment #2 Due)	(Chapters 18, 17, 19, 2, 3)
		24-31	Spring Vacation	
10		2	Inheritance Patterns: Factors Affecting Inheritance	4
		4	Variation in Chromosome Structure and Number	8
		6	Non-Mendelian Inheritance	5
11	April	9	Genetic Linkage and Mapping	6
		11	Population Genetics	27
		13	Population Genetics	27
12		16	Genetic Transfer in Bacteria	7
		18	EXAM IV (Take-Home Assignment #3 Due)	(Chapters 3 meiosis, 4, 5, 6, 8, 27)
		20	Molecular Technologies	21
13		23	Molecular Technologies	21
		25	Molecular Technologies/Metagenomics	21/23
		27	Biotechnology	22
14		30	Biotechnology	22
		2	Biotechnology/Funct. Genomics	22/24
15	May	4	EXAM V	(Chapters 7, 20, 21, 22, 23)
		7	Medical Genetics & Cancer	25
		9	Medical Genetics & Cancer	25
		11	Final Exam Review Day	
COMPREHENSIVE FINAL : Tuesday, May 15 (5/15) 12:30pm – 2:30pm				