

# PRINCIPLES OF GENETICS REVISED SYLLABUS

Biol 210 Sect 3 – Spring 2019

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**D2L:** Biol 210 Sect 3

**Office:** Tues/Thur 10-11 am

**Hrs:** (Wed or Fri by appointment)

**Required Text:** 1) Brooker, R.J. 2015. *Genetics: Analysis & Principles*, 6<sup>th</sup> ed. For rent in bookstore.

**Course Objective:** To study general principles of heredity and variation in organisms. This course uses a molecular approach to understanding the 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, and 3) Describe the relevance of some aspect of the natural science to their lives and society.

Biology/Biochemistry 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.

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.

**Class Meetings:** TNR 120: Tues & Thurs 11:00 am – 12:15 pm

**Grading:** Grades will be posted on D2L.

Exams (M/C, Problems)	% Points (out of 100)
Exam I	15
Exam II	15
Exam III	15
Exam IV	15
Comprehensive Final	25
Current Event Project	15
Extra Credit Project	up to 4%

Final Letter Grade - out of 100%	
A = 92.5-100	C = 72.5-77.4
A- = 89.5-92.4	C- = 69.5-72.4
B+ = 87.5-89.4	D+ = 67.5-69.4
B = 82.5-87.4	D = 60.0-67.4
B- = 79.5-82.4	F ≤ 60.0
C+ = 77.5-79.4	

**Exams:** There will be four (4) exams scheduled during our 75 minute lecture time. Each exam will cover 5 or 6 lectures, with the previous lecture **not** included if it is the start of a new chapter. Each exam is worth 15%.

**Comprehensive Final:** The final is worth 25% and includes all material covered in lecture.

**Research Projects:** You will also engage in 1 required project (worth 15%) and 1 optional project (worth up to 4% extra credit). **Extra credit is worth the value of about 11 exam questions, which is up to 27% points added onto an exam grade!!!** It is your choice as to whether you complete the extra credit project. Each project has its own deadline that is written in the schedule; projects will be accepted any day and time before the lecture of the deadline, but not after – no exceptions.

- Current Event Project – Paper on a Current Event on any topic within genetics.
- Extra Credit Project – Paper on a Genetic Disorder in humans or an organism of your choice.

**Weekly Problems:** Suggested problems from your textbook will be posted each week on D2L. Answers are in the back of the textbook for you to refer to. Other practice problems will be posted as well. Although all of these problems will not be graded, some **will** be used as actual questions on 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 (2 provided per week). Tutoring sessions are a great way to review and get help!

**Lecture Guide:** My PowerPoint slides are posted on D2L. Print out each chapter – 2 slides per page – before coming to each lecture. This way you can take notes directly on each slide. PPT images could inadvertently be used as a passive way to study; students who just read over the PowerPoint slides (regardless of them being on-line or printed) before exams typically earn a “C-” or below in this course. Therefore, I recommend you read your textbook after each lecture to reinforce your understanding of that material. Read especially the paragraphs and captions pertaining to the images shown in lecture while writing your own notes. Then try the practice problems after we complete each chapter. I also recommend each week to make up study-guide sheets. The final is cumulative, meaning it contains material discussed throughout the semester. To succeed on this final, you will need to 1) study from your study-guide sheets that you made before each exam and 2) make sure you understand the answers to each exam question and those I recommended from the textbook and on D2L. Page 3 describes a **great way to study.**

**Attendance Policy:** I strongly recommend you attend every lecture. Missing any class will put you at a distinct disadvantage when test taking. The only valid excuses for a student missing an exam are: death in the family, violent illness, or accident. In such cases: (1) you must provide evidence of some kind (eg. note from health center), **and** (2) you must reschedule **within 24 hours** after the deadline.

**E-mail:** Students are expected to check their University e-mail regularly for information from the university and/or instructors. If you are using an e-mail account other than your campus account to contact me, be sure your full name is included in the message

**Electronic Devices:** Cell phones should be turned **off** and **not** be displayed during class, lab or exam. No other communication or musical devices are allowed. Students needing a foreign language dictionary during exams may use one with permission from instructor. No video or audio recording of lectures is permitted without the prior written authorization from instructor.

**Extra Help:** Come see me during scheduled office hours or make an appointment for extra help. Form study groups with your classmates. In addition, tutors are available to help you with lecture material and assigned text problems. Interested students are encouraged to contact the Tutoring-Learning Center. Students with a disability requiring accommodations should register with the Disability and Assistive Technology Center in the Learning Resource Center (the Library) and contact me at the beginning of the course.

**Academic Conduct:** You are responsible for the honest completion and representation of your work and for the respect of others’ academic endeavors. Any act of cheating, plagiarism, or academic misconduct is subject to the penalties outlined in UWS Chapter 14. Please refer to this link for more information:

**<http://www4.uwsp.edu/natres/nres701/plag.pdf>**

## 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 have 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.

If you can teach it to another person, then you know it! **“The best way to learn is to teach!”**

**GENETICS SCHEDULE**  
**(exam dates are firm, chapter dates are tentative)**

Week	Date	Topic	Chapter (Slides)
1	Jan 22	Syllabus / Overview of Genetics / DNA as Genetic Material	1
	24	DNA Structure	9
2	29	RNA Structure / Chromosome Organization	9 / 10
	31	Cell Cycle & Mitosis	3 mitosis
3	Feb 5	DNA Replication	11
	7	Telomerase Activity / Transcription	11/12
4	12	<b>EXAM I</b>	<b>(1, 3(mit), 9, 10, 11)</b>
	14	RNA Modification	12
5	19	Translation	13
	21	Translation	13
6	26	Gene Regulation	14 / 15
	28	<b>No Class</b>	15
7	Mar 5	DNA Mutation	19
	7	<b>EXAM II</b>	<b>(12, 13, 14, 15)</b>
8	12	DNA Repair / Meiosis	19 / 3 Meiosis
	14	Mendelian Inheritance	2
<b>March 19, 21 SPRING BREAK</b>			
9	26	X-linked Traits	2 / 4
	28	<b>RESEARCH PROJECT DUE</b> Variation in Chromosome Structure & Number	8
10	Apr 2	Non-Mendelian Genetics	8 / 5
	4	<b>EXAM III</b>	<b>(19, 2, 3, 4, 8)</b>
11	9	Genetic Linkage & Mapping in Eukaryotes	5 / 6
	11	Genetic Linkage & Mapping in Eukaryotes	6
12	16	Population Genetics	27
	18	Population Genetics	27
13	23	Recombinant DNA Technology	21
	25	Recombinant DNA Technology <b>EXTRA CREDIT PROJECT DUE</b>	21
14	30	Biotechnology	22
	May 2	<b>EXAM IV</b>	<b>(5, 6, 7, 21, 27)</b>
15	7	Biotechnology / CRISPR	22 / 17
	9	Medical Genetics & Cancer	25
<b>FINAL</b>	<b>Tue 14</b>	<b>COMPREHENSIVE FINAL: 12:30 – 2:30</b>	<b>1-6, 8-15, 19, 21, 25, 27</b>

