

Biology 202- Molecular Biology and Genetics

Spring 2010 (Section 007) Dr. Kelly Hogan and Dr. Joe Kieber

Lectures: 201 Coker Hall (Tues/Thurs 9:30-10:45 AM)

Recitations: (you *must* be **registered** for one of the 8 sections: 701-708)
(Tues. 1 and 2 PM; Wed. 3 PM; Thurs. 2, 3, or 4 PM and Fri 1 and 2 PM)

Instructors: **Dr. Kelly Hogan**

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Office location: Wilson Hall 104B

Office phone: 843-6047

Office Hours: Tuesdays 11:30-12:30, and Fridays 10:15-12:15

and after class any day that I lecture. *You can also reach me by email to set up a phone appointment.* Advising questions? You can set up an appointment with me through the academic advising website.

Dr. Joe Kieber

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Office location: 312 Coker

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Office hours: Tues and Thurs 11:00-12:00 or by appointment.

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Chia-Yi Cheng chiayic@email.unc.edu

COURSE WEBSITE: <http://blackboard.unc.edu/> (you will need your onyen to log in)

This site will have postings from our lectures such as outlines, power point slides, supplemental material that we mention in lecture, and the problem sets for the 2nd half of the course. We will also post announcements on this site. *It is your responsibility to check it regularly.*

Introduction to Genetic Analysis, 9th Edition, W.H. Freeman & Co.

by Griffiths, Wessler, Lewontin, and Carroll

Chapter 1 will not be assigned reading, but it is a good overview. Read through it at the beginning of the course...and use it as a great review at the end of the course.

Use the website associated with the book! Web-based bioinformatics tutorials, animations, and other supplemental information can be found at <http://bcs.whfreeman.com/iga9e/>

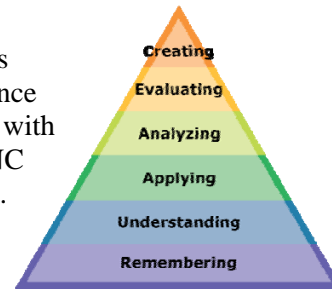
COURSE GOALS:

1. To provide you with the core principles of genetics and molecular biology.

The lecture and the book will provide the basic content. We will take a historical approach at times to see how famous experiments were performed. We will examine the basic “rules” of genetics that may then be altered to account for more complex situations. After this class, you will be prepared to do research in a lab on campus and to build upon this content with Biol 205 and upper level genetics courses.

2. To gain higher level thinking skills that are necessary for scientists.

To the right you can see the “Amended Bloom’s Taxonomy” pyramid. It was developed as a method of classifying educational goals for student performance evaluation. You should be well –equipped at remembering facts and content with good study habits. We are looking for you to *apply* and *analyze*. You are UNC students, we KNOW you can memorize! Move beyond this level of thinking. How can we achieve this? We will have in-class questions to practice this immediately and you will have homework problems to practice on your own. We will also explore classic experiments as a way of thinking through the logic of experiments and to see where the foundations of this content come from. While these may be new ways of thinking for you, practice is the most important way to gain these skills. FYI: UNC’s medical school sees this is an excellent pre-req course for medical school because it teaches students to *think*.



3. This course should excite you about basic science and its applications.

A foundation in genetic crosses with model organisms (basic science tool) allows you to understand human genetic diseases. A foundation in making recombinant DNA constructs (basic science tool) allows you to understand how plants are modified to be herbicide resistant or how recombinant proteins can be turned into medicines. Genetics and molecular biology are the “tools” that other disciplines call upon in biological research. Plant biologists, evolutionary biologists, clinical researchers *etc.* all use these tools.

COURSE POLICIES

1. Examination format:

Three semester exams and one final exam will be given. The final examination is cumulative for the entire semester. Students are expected to take all exams and the final examination on the dates indicated during the regular class period. **No make-up exams will be given.** If a student must miss a semester exam for an excused reason, then the final exam will be weighted more heavily. The questions on the final exam that correspond with the missed material will become the grade for the missed exam.

2. Recitation:

Attendance and participation in the recitation section is a critical component of this course and, therefore, is required. Recitation assignments correspond to the topics covered in lecture. Students are expected to work the assignments prior to recitation. Recitation will include in-class discussion of assignments and review.

Your recitation grade will consist of participation in class recitation quizzes (**no make-ups** given on these quizzes). If you miss a recitation quiz due to an *excused* absence, you will not be penalized (your quiz grade will reflect the number of quizzes taken).
DON'T FALL BEHIND!

3. Grading:

66% (three semester exams worth 22% each)

24% (cumulative final examination)

10% (recitation-- includes required attendance/participation and quizzes)

Answers to problems on the exams will be posted after each exam, except for the final. Students must consult the key before contacting the instructor regarding grading questions. All questions pertaining to the grading of an exam must be addressed within two weeks of receiving the graded exam. All requests for a re-grade must be handed in to the TA IN WRITING. The ONLY exception will be simple errors in addition.

POLL EVERYWHERE:

This is a web-based tool that allows students and instructors to interact. The instructor can ask a variety of questions (multiple choice or open ended) and the class can respond immediately through the internet or through text- messaging. This is a new tool that we are trying this semester. The benefit is that it is of no cost to you. If you use a cell phone that does NOT have a text plan, you may incur charges, but your laptop would be a completely free way to go. **Information about registration is posted on blackboard. Please follow the instructions, so that we can properly link each student to their answers.** You will be expected to attend lecture and answer all questions in class. These questions are meant to help you apply the information you are learning immediately, review difficult concepts, interact with your peers, and give the instructor feedback on your learning.

The Honor Code

All work done in this class must be carried out within the letter and spirit of the UNC Honor Code. You must sign a pledge on all graded work certifying that no unauthorized assistance has been given or received. You are expected to maintain the confidentiality of examinations by divulging no information about any examination to a student who has not yet taken that exam. You are also responsible for consulting with your professors if you are unclear about the meaning of plagiarism or about whether any particular act on your part constitutes plagiarism. Please talk with the professor if you have any questions about how the Honor Code pertains to this course.

TIPS FOR SUCCESS: Please read the assigned textbook pages twice! Read once **before** the lecture, look over the text to familiarize yourself with what you will hear during the lecture. Go back to the reading assignment after the lecture and re-read the portions that were stressed during lecture. The lecture material is the number one source of exam questions. This is where you want to invest time for detailed understanding. Recognize that your attendance at the lectures is the only way to clearly grasp what we stress, because we also present topics and material that are not necessarily in the book.

Take notes in class; reinforce what you learned. Learning is an active process. If you get confused during a lecture, mark in your notes the point during the lecture where you became confused. Mark in your notes the point where your understanding returned (i.e. change of topic or new topic). This will allow you to clearly identify that part of the lecture that you did not understand. Then go back to the assigned reading and seek clarification.

Immediate reinforcement is most effective directly after hearing the lecture. So, instead of leaving the lecture hall and immediately checking your cell phone for messages, think calmly to yourself as you walk to your next class “What are the main take home messages from today’s lecture?” Cramming is unlikely to be successful. Trust us.

Ask questions and participate in recitations! Raise your hand, be engaged! Ask for clarifications from the lecture material; come to our office hours, study with other students. Discussions help reinforce the material we learn.

Do the homework. It is much more useful to try to work out the homework problems before you know the answers. This will help you realize what aspects of the material you are weak in, and the process of trying to work out the answers will greatly help in your understanding and retention of the material. A portion of the exam questions will be similar to the homework questions. So make sure you **understand** the answers.

Lecture	Topic	Readings (chapter)	
Tues Jan 12	Introduction to course & Structure of Genes and Genomes	2.1	KH
Thurs Jan 14	Review of Meiosis and Single Gene Inheritance and Pedigrees	2.2- 2.6	KH
Tues Jan 19	Cont. Pedigrees and Independent Assortment	2.6 and 3.1-3.4	KH
Thurs Jan 21	Genetic Recombination: Recombination, Linkage, Mapping	4.1 and 4.2	KH
Tues Jan 26	Genetic Recombination: Recombination, Linkage, Mapping (continued)	4.1 and 4.2	KH
Thurs Jan 28	Gene Interactions	6.1-6.4	KH
Tues Feb 2	Cont. Gene Interactions	6.1-6.4	KH
Thurs Feb 4	The Nature of DNA and DNA Replication	7.1-7.6	KH
Tues Feb 9	Exam 1	Includes material from Jan 12- Feb 2	KH
Thurs Feb 11	RNA: Transcription and Processing	8.1-8.4	KH
Tues Feb 16	Translation and Protein Structure and Function	9.1-9.6	KH
Thurs Feb 18	Bacterial Genetics	Chapter 5	JK
Tues Feb 23	Gene Mutations	Chapter 15	JK
Thurs Feb 25	Gene Mutations (cont.) and Chromosome Mutations	Chapter 15 Chapter 16	JK
Tues March 2	Chromosome Mutations (cont.)	Chapter 16	JK
Thurs March 4	Exam 2	Includes material from Feb 4 – Feb 25	both
SPRING BREAK!	SPRING BREAK!	SPRING BREAK!	
Tues March 16 <i>(3/15 last day to drop)</i>	Regulation of Prokaryotic Transcription I	Chapter 10	JK
Thurs March 18	Regulation of Prokaryotic Transcription II	Chapter 10	JK
Tues March 23	Regulation of Eukaryotic Transcription	Chapter 11	JK
Thurs March 25	Chromatin	Chapter 11	JK
Tues March 30	Recombinant DNA Technology I	Chapter 20	JK
Thurs April 1	Recombinant DNA Technology II	Chapter 20	JK
Tues April 6	Genomics	Chapter 13	JK
Thurs April 8	Exam 3	Includes material from March 2- March 30	JK
Tues April 13	Mobile genetic elements	Chapter 14	JK
Thurs April 15	Genetics of the Cell Cycle and Cancer	Chapter 15 pp 546-54	JK
Tues April 20	Stem Cells	Will be posted on BB	KH
Thurs April 22	Modeling Human Disease in Mice	p. 745-753	KH
Tues April 27	Epigenetics: "Ghost in Your Genes"	NOVA video	KH
Sat May 1	8 AM: Cumulative Final Exam	201 Coker Hall	both

Recitation Week	Lecture	Lecture Topics during this week	Recitation problems due for this week
1 (week of Jan 11)	Tues Jan 12	Introduction to course & Structure of Genes and Genomes	Intro and review meiosis and independent assortment
	Thurs Jan 14	Review of Meiosis and Single Gene Inheritance and Pedigrees	
2 (week of Jan 18)	Tues Jan 19	Cont. Pedigrees and Independent Assortment	Single Gene Inheritance: Ch 2: 14,16,17, 20, 26, 32, 34 Pedigrees: Ch 2: 37,38A, 42, 44, 47, 48, 49, 57, 64
	Thurs Jan 21	Genetic Recombination: Recombination, Linkage, Mapping	
3 (week of Jan 25)	Tues Jan 26	Genetic Recombination: Recombination, Linkage, Mapping (continued)	Independent Assortment: Ch 3: 1acd, 2, 9, 16, 18 Recombination: Ch 4: 1, 2, 3, 6, 7, 12ab, 48
	Thurs Jan 28	Gene Interactions	
4 (week of Feb 1)	Tues Feb 2	Cont. Gene Interactions	Gene Interactions: Ch 6: 1, 2, 4ab, 8, 12, 16, 21, 27, 49, 51, 52
	Thurs Feb 4	The Nature of DNA and DNA Replication	
5 (week of Feb 8)	Tues Feb 9	Exam 1	DNA and replication: Ch 7: 1-8, 16, 19, 20, 21, 23ab, 24, 27a, 28
	Thurs Feb 11	RNA: Transcription and Processing	
6 (week of Feb 15)	Tues Feb 16	Translation and Protein Structure and Function	Transcription: Ch 8: 2, 3, 4, 6, 7, 9-14, 16, 18
	Thurs Feb 18	Bacterial Genetics	
7 (week off Feb 22)	Tues Feb 23	Gene Mutations	Translation: Ch 9: 2, 3, 5, 6, 9, 12, 13, 17, 19, 20, 22
	Thurs Feb 25	Gene Mutations (cont.) and Chromosome Mutations	

(*The assignments for the second half of the course will be announced during the semester.)