Prerequisites
BIOL 101 and CHEM 101, with a grade of C or better

Your instructors

Dr. Blaire Steinwand  Coker Hall 212
Office hours:
Web page: http://bio.unc.edu/people/faculty/steinwand-blaire/
Email: blairejs@live.unc.edu

Dr. Gidi Shemer  Coker Hall 213A
Office hours:  Wed, 9-11 ; Thu, 2:30-4:30 ; or by appointment
Web page: http://www.bio.unc.edu/Faculty/Shemer/
Email: bishemer@email.unc.edu

Your TAs
TBA

Recitations

601 Th 11:00-11:50  (Hanes 107)  605 Fr 6:00-6:50  (Wilson 213)
602 Th 2:00-2:50  (Wilson 217)  606 Fr 12:00-1:10  (Wilson 213)
603 Th 5:00-5:50  (Hanes 125)  607 Fr 1:25-2:15  (Wilson 213)
604 Th 6:00-6:50  (Hanes 125)  608 Fr 2:30-3:20  (Wilson 213)

Supplemental Instruction
Sam Eure: euresa@live.unc.edu
Vishal Iyer: vbiyer@live.unc.edu
Anne Feng: annefeng@live.unc.edu

Main Goals of the course

1. To provide you with the core principles of genetics and molecular biology
2. To gain higher level thinking skills
3. This course should excite you about basic science and its applications
Copyright Information:  
All materials used in this course including notes, tests and assignments are covered by copyrights, which forbid you from sharing class materials with any group.

Expectations  
The course is composed of two class meeting and one recitation session each week. This is NOT a class for passive learners. You are expected to be actively engaged in this course through class discussions, class activities and pre- as well as post-lecture assignments and readings.  
It is expected that you will spend several hours reading/working problems associated with each class. If you stay on top of your reading and homework, there will be no need to cram for an exam. Practice, practice, and practice more. Use the internet or other textbooks in the library to find more problems if you run out from your textbook.

You are expected to VISIT TUTORS for content questions and weekly review/help with problems. Successful students use tutors routinely. Don’t wait. Check in regularly, maybe with a buddy or small group. Form your own study groups too. Attend SI sessions (see below) to review material with your SI leaders

Textbook  

The textbook is available in the bookstore in different formats. This text comes with a web-based software package called MasteringGenetics that will be the medium through which you will be quizzed and receive short pre-lecture and post-lecture assignments. The package also includes an interactive eBook. There are also other purchase options of the textbook (e.g. you can buy a used textbook and a stand-alone MasteringGenetics package). After you enroll in MasteringGenetics, find the course using these codes:

Your Course Name: BIOL 202, Steinwand and Shemer  
Your Course ID: shemer93502

Recitations  
During recitations, Teaching Assistants will lead you through activities or problem solving practices. This course is a 4 credit hours course, and the recitations are not simply “going over the material that was learned in class”, but rather a core component of the course. Some of the material covered in recitations will be supplemental to the one discussed in class. There will be no make-up opportunities for in-class assignments if you do not attend a recitation in a given week. If you are unable to attend the recitation for which you are registered one week, you may attend another section with prior permission of the TAs if there is room in another section. There is a maximum capacity for each section so please do not assume that you can attend another section if you miss a recitation.

Supplemental Instruction  
Twice a week, we will offer supplemental instruction (SI) sessions (days- TBA). The sessions will be led by undergraduate students who excelled in this class in a previous semester. The SI sessions will allow you to process and actively practice material that was taught in the previous week. Students referred to the SI sessions in the past as one of the most significant tools that improved their learning.
**Tutoring**
The biology peer tutoring program offers free tutoring Mon-Thu evenings. Some of our best students who excelled in this class will be happy to assist you. Come with your textbook and your specific questions. Remember, the tutors are there to help you, not to do the work for you. The tutoring schedule can be found here: [http://bio.unc.edu/undergraduate/course-info/tutoring/](http://bio.unc.edu/undergraduate/course-info/tutoring/)

**Class and Recitations Attendance**
Students are expected to attend and participate in class meetings and recitations. While the course follows the textbook, some of the material discussed in lecture may not be found in the text. You are responsible for all material and announcements made in lectures. You are not responsible for material that was not covered in class, unless it was specifically assigned (see detailed schedule for assigned readings).

**Assignments**
During the semester you will have **pre-class, in-class, and post-class assignments**.

- The pre-class assignments will be based on **assigned readings from the textbook**. The assignments will be given via the MasteringGenetics system (see above).
- In-class assignments will include **Polleverywhere** (see below), Learning Catalytics and other activities.
- Post-class assignments will include MasteringGenetics and occasionally Peerwise assignments and written **Homework Assignments** (see below).

All assignments due dates appear on the detailed schedule. Updates will be announced on Sakai. You are responsible for submitting the assignments on time. There will be no “second chances” in this case.

**Learning Catalytics**
10% of your grade will come from a program called Learning Catalytics that you use through your laptop or mobile phone. Note - missing just a couple of classes can quickly affect your participation grade! See Sakai for the required registration and troubleshooting information.

**PeerWise**
One of your assignments during the semester will be to create multiple choice questions that address the material we learn. Asking questions and evaluate your peers’ questions has been shown to be an invaluable tool in developing deep learning. Posting and reviewing questions will be done through an interactive system called PeerWise. Instructions on how to register and how to use PeerWise will be given during the semester.

**Homework Assignments**
Problem sets will be posted on Sakai. Written answers are to be handed in at your recitation section the week the assignment is due. Solutions to the problem sets will be posted the subsequent weekend. TAs will grade a selected problem on the homework, and performance on the problem sets will contribute to your recitation grade.
Grading
The material taught in class meetings and labs will be tested separately but the grades are combined for the final course grade. Your grade for this course will be determined as follows:

3 midterm exams = (18% each = 54%)
1 cumulative final exam (18%)
MasteringGenetics assignments (8%)
Recitations (10%)
Peerwise & Learning Catalytics activities (10%)

Grades will not be assigned for individual exams, only points. Final grades will be assigned on the total number of points for the entire semester: A 93-100; A- 90-92; B+ 87-89; B 83-86; B- 80-82; C+ 77-79; C 73-76; C- 70-72; D+ 66-69; D 60-65; F <60
A curve will be used ONLY if the class grade average is <75. Exam questions will be taken from class meetings and assigned readings. Exams must be taken on the dates indicated; no makeup exams except in special circumstances, i.e. medical or family emergency documented in writing.

THE PROFESSORS RESERVE THE RIGHT TO MAKE CHANGES TO THE SYLLABUS, INCLUDING PROJECT DUE DATES AND TEST DATES. THESE CHANGES WILL BE ANNOUNCED AS EARLY AS POSSIBLE

Schedule For a detailed schedule, including assigned readings, assignments, recommended readings, and objectives, check the lecture schedule under the Sakai “Syllabus” folder

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1- T 08/18 (Steinwand)</td>
<td>Structure and function of genes and genomes</td>
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<td>2- R 08/20 (Steinwand)</td>
<td>Genetic variation- from genotype to phenotype</td>
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<td>3- T 08/25 (Steinwand)</td>
<td>DNA replication</td>
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<td>4- R 08/27 (Steinwand)</td>
<td>Genetic variation arises by mutation</td>
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<td>5- T 09/1 (Steinwand)</td>
<td>Genetic variation arises by chromosomal rearrangements</td>
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<td>6- R 09/3 (Steinwand)</td>
<td>Gene Dosage</td>
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<td>7- T 09/8 (Steinwand)</td>
<td>Personal genomics</td>
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<td>8- R 09/10 (Steinwand)</td>
<td>In-class practice exam</td>
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<td>T 9/15</td>
<td>EXAM 1 (Lectures 1-8)</td>
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<td>9- R 09/17 (Shemer)</td>
<td>The flow of genetic information- Transcription</td>
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<td>10- T 09/22 (Shemer)</td>
<td>Gene Expression- The making of a transcript</td>
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Course Learning Outcomes

Upon completion of the 202 course in Biology, a student should be able to:

(Skills):
• Build hypotheses to answer a specific scientific question, design an experiment using an appropriate technique/assay to answer the question, and predict results of their experiment.
• Give examples of how advances in genetics and molecular biology, from the discovery of DNA's structure to sequencing individual genomes, have changed the world (examples include recombinant insulin, personalized medicine, transgenic crops)

(Concepts):
• Explain the term “allele” for a single gene at a population, organismal, cellular, and molecular level; explain how dominance and recessiveness are expressed at these levels.
• Explain how genetic variation comes from in a population (e.g. from meiosis, mutation, and epigenetic changes).
• Predict genotypic and phenotypic ratios of offspring in defined genetic crosses and work these problems in reverse (when given data about offspring, determine the genotypes and phenotypes of the parents).
• Deduce modes of inheritance (example: autosomal dominance, x-linked recessive) from genetic pedigrees and explain how incomplete penetrance and variable expressivity complicate these analyses.
• Distinguish single gene traits from polygenic traits and the influence of the environment on traits.
• Explain how DNA is replicated normally and abnormally and how these concepts are utilized in the polymerase chain reaction (PCR).
• Compare and contrast the consequences of germline errors during meiosis (such as non-disjunction, and translocations) and somatic errors during abnormal mitosis (such as non-disjunction and cancer).
• Explain the flow of genetic information, based on the central dogma- from DNA to proteins and how mutations are carried through this flow of information.
• Describe the nature of the genetic code
• Describe the general organization of prokaryotic and eukaryotic genomes, including the identification and significance of the different parts of a gene (e.g. regulatory/non-regulatory, exons/introns; transcription start site; translation start site; UTRs).
• Explain how a gene can be regulated transcriptionally and post-transcriptionally and how this leads to limited expression under different conditions (such as in different environments, during the course of development, or disease conditions).
• Predict the outcome of experimental manipulations in genes (e.g. GFP-tagging to investigate gene expression).
• Describe the basic steps in gene cloning (restriction, ligation, etc.).
• Design a transgenic animal/bacteria, where a protein of interest is specifically produced.
• Explain the significance of research in genetic model organisms to understand fundamental biological phenomena.