BZ 350 Molecular and General Genetics  
Fall 2016  
61955  
Dan Sloan and A.S.N. Reddy

SYLLABUS

Lectures  
3:00-3:50am MWF, Behavioral Sciences Building (BSB) 131

Lecture Instructors  
Dan Sloan; 491-2256; dbsloan@rams.colostate.edu; Office hours: 4-5 pm MWF or by appointment*, A/Z E212.

A.S.N. Reddy; 491-5773; reddy@colostate.edu; Office hours: 4-5 pm MWF or by appointment*, A/Z E321.

*To make an appointment at a time other than office hours, send the lecturer an e-mail with multiple options for when you can meet.

Recitation Instructors  
Neha Ahuja      ahujanh@gmail.com F 9am-11am Yates 208  
Jacob Edwards   jedwar@colostate.edu W 9-11am Yates 208  
Jesse Gray      jesse.gray@colostate.edu M 9-11am Library (Outside) 301A  
Ava Hoffman     ava.hoffman@colostate.edu Th 1-2pm, 4-5pm A/Z 430

Office hours are additional times to get questions about genetics answered. Generally, genetics questions are not answered by e-mail.

Recitation Sections  
61956  BZ 350 - R01 Tue 2:00 - 2:50 PM Yates 208 Jesse Gray  
61957  BZ 350 - R02 Tue 3:00 - 3:50 PM Yates 208 Jesse Gray  
61958  BZ 350 - R03 Tue 4:00 - 4:50 PM Yates 208 Neha Ahuja  
65765  BZ 350 - R04 Wed 2:00 - 2:50 PM Yates 208 Neha Ahuja  
66678  BZ 350 - R05 Wed 4:00 -4:50 PM Yates 208 Jacob Edwards  
66679  BZ 350 - R06 Wed 5:00 - 5:50 PM Yates 208 Jacob Edwards  
66680  BZ 350 - R07 Thu 2:00 - 2:50 PM Yates 208 Ava Hoffman  
76903  BZ 350 - R08 Thu 3:00 - 3:50 PM Yates 208 Ava Hoffman
Course Description
The goal of this course is to provide an understanding of biological inheritance. Simply put, we will explore why offspring tend to look like their parents and why this resemblance is often incomplete. This is a broad course. Among other things, we will address the statistical methods that are used to study inheritance in entire populations all the way down to the level of the specific molecules and molecular mechanisms that are involved in the transmission of biological information. In the end, the goal is to produce an integrated view of inheritance across these levels and make it clear why genetics is at the core of so many different fields within the biological sciences.

Learning Goals
After taking this course, students should be able to…

- apply statistical techniques to interpret genetic data from controlled crosses and natural populations.
- explain the central dogma of molecular biology (and subsequent elaborations) and understand the key molecules and mechanisms associated with biological inheritance.
- interpret genetic experiments based on hypothesis testing and the scientific method.
- express complex genetic concepts in writing.
- make connections between the field of genetics and important societal issues, including human health, conservation, and genetic engineering.

Course Content

<table>
<thead>
<tr>
<th>Course Content</th>
<th>Approx. # of Lectures</th>
<th>Readings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction to Genetics</td>
<td>1</td>
<td>Posted paper</td>
</tr>
<tr>
<td>2. Mendelian Inheritance</td>
<td>3</td>
<td>Chapter 2 and 3</td>
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<tr>
<td>3. Quantitative Genetics</td>
<td>2</td>
<td>Chapter 21.1</td>
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<tr>
<td>4. Cytogenetics</td>
<td>2</td>
<td>Chapter 4.1-5</td>
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<tr>
<td>5. Linkage, Association, and Genetic Mapping</td>
<td>4</td>
<td>Chapter 5 and 21.2</td>
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<tr>
<td>7. Non-Mendelian Inheritance</td>
<td>2</td>
<td>Chapter 14</td>
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<tr>
<td>8. Sex-Linked Inheritance and Expression</td>
<td>2</td>
<td>Chapter 4.6-7</td>
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<tr>
<td>9. Prokaryotic Genetics</td>
<td>2</td>
<td>Chapter 13</td>
</tr>
<tr>
<td>10. Why Study Molecular Genetics</td>
<td>1</td>
<td>Posted Material</td>
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<tr>
<td>11. DNA Structure, Replication, &amp; Recombination</td>
<td>3</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>12. Mutation</td>
<td>1</td>
<td>Chapter 7</td>
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<tr>
<td>13. Transcription &amp; Translation</td>
<td>4</td>
<td>Chapter 8</td>
</tr>
<tr>
<td>14. Gene Regulation in Prokaryotes</td>
<td>2</td>
<td>Chapter 15</td>
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<tr>
<td>15. Eukaryotic Chromosome Structure</td>
<td>1</td>
<td>Chapter 11</td>
</tr>
<tr>
<td>16. Gene Regulation in Eukaryotes</td>
<td>3</td>
<td>Chapter 16</td>
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<tr>
<td>17. Molecular Methods</td>
<td>2</td>
<td>Chapter 9 and 10</td>
</tr>
<tr>
<td>18. Genomics</td>
<td>2</td>
<td>Chapter 9 and 10</td>
</tr>
<tr>
<td>19. Applications of Molecular Methods in Medicine and Agriculture</td>
<td>1</td>
<td>Chapter 17 and Posted Material</td>
</tr>
</tbody>
</table>
Textbook

iClicker
We will be using iClicker in the lectures, and, if you do not already have one, you should purchase an iClicker remote from the bookstore for in-class participation. iClicker is a response system that allows you to respond to questions that the instructors pose during class, and you will be graded based on your participation.

In order to receive credit for iClicker participation, you will need to register your iClicker remote online through the Canvas website for this course (http://canvas.colostate.edu/). This should be done before Wednesday August 24th. To register, log on to Canvas, navigate the BZ 350 course page and find the i>Clicker link on the left side of the page. More detailed instructions for how to register are available at the address below:
http://iclicker.colostate.edu/docs/Canvas%20iClicker7%20Student.pdf

We anticipate using iClicker every day in class, and you are responsible for bringing your remote daily. To receive full credit for iClicker participation, you may miss up to three classes. Please note that the three-class allowance includes absences related to a valid excuse as well as any days on which you forget your remote, your battery was dead, etc. Exceptions will not be granted for missed participation above the three-class allowance.

Course materials will be available through Canvas (http://canvas.colostate.edu/) and include the following:
1) Lecture slides
2) Weekly reading assignments and problem sets (posted by Sunday evening)
3) Exam preparation materials and exam answer keys

Tutoring
Free tutoring is available for this course through the Arts & Sciences Tutoring Program. The program is located in the Russell George Great Hall in The Institute for Learning and Teaching (TILT). No appointment is necessary and all students are welcome. For more information and tutoring schedule, please visit: http://tilt.colostate.edu/learning/tutoring/artSciences/index.cfm

Exams
There will be three non-comprehensive 50 minute exams and a comprehensive final exam.

1) Lecture material for the first hour exam will end on Friday September 16, and the first hour exam will be held in the lecture hall Friday September 23.
2) Lecture material for the second hour exam will end on Wednesday, October 12, and the second hour exam will be held in the lecture hall Friday October 21.
3) Lecture material for the third hour exam will end on Friday November 4, and the third hour exam will be held in the lecture hall Friday November 11.
4) The last lecture is Friday May 6, and the final exam will be held in the lecture hall according to the final exam schedule on Wednesday, December 14 - 7:30-9:30 am. The final is comprehensive, but it will be weighted towards the second half of the course, particularly material since the third exam. Approximately 75% of the points will focus on material from
the second half of the course with a particular emphasis on new material since the third exam.

We will supply paper for all exams. Students are responsible for bringing their own simple calculators to exams. These calculators should be capable of calculating powers and factorials, e.g., the TI30AX, the TI30XIIS, the TI30XS available at the CSU Book Store. Calculators capable of storing and displaying text are NOT allowed for tests. Student use of a text-capable calculator during an exam (whether there is demonstrably text stored on it or not) is considered cheating with the penalties associated with it (see below).

Missed hour exams count as zeros unless the lecture instructors have an excuse they deem to be valid in writing. Students who miss exams because of a school sponsored activity need to see the lecture instructor for other arrangements prior to the exam. No more than one midterm exam can be missed, even with a valid excuse, and the final exam cannot be missed.

Problem sets and recitation sections
All students must be enrolled in a recitation section, which will meet every week including the first week of class. Problem sets and corresponding reading assignments will generally be posted on the course web site on Sunday nights and correspond to the material covered in the coming week’s lectures. **Problem sets will be turned in on Mondays (a full week after they are posted) at the beginning of the lecture period in the lecture hall.** Problem sets cannot be turned in late, *i.e.*, any time after 3 pm on Monday, the assignment is late and will not be accepted under any circumstances. **However, there are two exceptions. Monday September 5 is a University holiday, so the problem set due that week will be submitted in class the preceding Friday (September 2), and Monday November 21 is during Fall Break so the problem set is due the following Monday November 28.** At the beginning of each recitation period, graded problem sets turned in on Monday will be returned to students.

Recitation periods will involve answering questions, working problems, and expanding on themes related to the previous week’s material and the graded problem sets that were just returned. Recitation will not be used to discuss the current week’s problem set that has not yet been turned in.

There will be a total of 13 problem sets. Each will be graded on a 15-point scale. For full credit on problems, students must **show their math and explain their reasoning in full sentences.** The two lowest problem set grades for each student will be dropped, so the total problem set grade for the semester will be out of 165 points. Students will also be graded on attendance and participation in recitation sections (3 points per week; 45 points total). To obtain full credit, students must attend and remain through the whole period and participate in the discussion of problem sets and related genetic concepts. If students have a valid excuse that prevents them attending recitation section, they must make arrangements with their TA (in advance) to attend another section that week. If necessary, they should also make arrangements to ensure that problem sets are submitted by the normal deadline.

In addition, each student is allowed (not required) to make one short presentation (4 minutes maximum) of a “Genetics in the News” article at the beginning of a recitation period. To do this, a student must give a copy of the article to the TA and arrange for a time when the presentation will be made to the recitation class. Making a presentation will be rewarded by the addition of 0 to 5 extra credit points, depending on the quality of the presentation.
Regrading of Exams and Assignments:
If students have concerns about grading, they must present the assignment for regrading within one week of when it was returned. Regrade requests for exams must be presented to the lecture instructor. Regrade requests for problem sets should be submitted to the recitation instructor (TA). We are happy to discuss how an assignment was graded at any point, but formal regrade requests will only be accepted within the one-week time window. For any regrade requests, the entire assignment (not just individual questions) will be regraded. Therefore, it is possible to lose points on a regrade if we find that credit was mistakenly given for incorrect answers.

Grading: Grades will be based on exams, problem sets, participation in recitations, and iClicker participation, according to the following breakdown:

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
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</thead>
<tbody>
<tr>
<td>Hour Exams (3)</td>
<td>300</td>
</tr>
<tr>
<td>Final Exam</td>
<td>200</td>
</tr>
<tr>
<td>Problem Sets</td>
<td>165</td>
</tr>
<tr>
<td>Recitation Attendance/Participation</td>
<td>45</td>
</tr>
<tr>
<td>iClicker Participation</td>
<td>30</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>740</strong></td>
</tr>
</tbody>
</table>

Individual exam grades will not be curved, but if the class average is less than 75%, final grades will be curved to bring the class average to 75%. Individual student’s fractional grades will be rounded to the nearest whole number (e.g., 69.6 = 70 and 69.4 = 69). Then grades will be assigned on the following scale:

- 97-100 A+
- 93-96 A
- 90-92 A-
- 87-89 B+
- 83-86 B
- 80-82 B-
- 77-79 C+
- 70-76 C
- 60-69 D
- 0-59 F

Academic Integrity
It is not acceptable to copy answers from another student’s problem set, the text, or a solutions manual. Unless the source and author are cited and the work placed in quotation marks, a copied answer is plagiarism. Furthermore, even if a work is properly cited, it is as unacceptable to copy someone else's work, a text, or a solution’s manual for a problem set. Recognizably copied answers will receive zero credit and be considered cheating. Bringing another student’s iClicker to class and using it in his/her place will also be considered as an act of academic dishonesty for which both the owner of the iClicker and the student who brought it to class will be held responsible.
This course will adhere to the CSU Academic Integrity Policy as found on the Student Responsibilities page of the CSU General Catalog and in the Student Conduct Code.

http://catalog.colostate.edu/general-catalog/policies/students-responsibilities/#academic-integrity
http://www.conflictresolution.colostate.edu/conduct-code

At a minimum, violations will result in a grading penalty in this course and a report to the Office of Conflict Resolution and Student Conduct Services.

For exams, cheating in BZ 350 is defined as giving or receiving unauthorized assistance. For problem sets, cheating is copying someone else’s work or permitting your work to be copied. Referring to solutions manuals, looking at assignments from previous semesters, and working in groups on problem sets is OK, but answers must be in your own words.

On each exam, you will have the opportunity to sign the following honor pledge.

**Honor Pledge:** I have not given, received, or used any unauthorized assistance, nor will I do so.

________________________________________

You are not required to sign the pledge, nor is there any penalty for not signing. It is simply a reminder that your integrity is the most valuable personal asset that you possess.