

BIOL 230 GENETICS
sec 01: TR 10:00 – 11:15
sec 02: TR 11:30 – 12:45

Albers 107
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SPRING '08

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"Genetics has become an indispensable component of almost all research in modern biology and medicine. This position of prominence has been achieved through the powerful merger of classical and molecular approaches. Each analytical approach has its unique strength: classical genetics is unparalleled in its ability to explore uncharted biological terrain; molecular genetics is equally unparalleled in its ability to unravel cellular mechanisms...Armed with both approaches, students are able to form an integrated view of genetic principles." (Griffiths, *et al.*, An Introduction to Genetic Analysis fifth Ed. 1993). I couldn't have said it better myself!

Goals

The goal of this course is to help students learn about genetic technology and learn to use genetics in a variety of biological situations. Given a biological phenomenon or problem, students should be able to:

1. Identify which aspects of the phenomenon are amenable to study using genetics.
2. Propose and outline appropriate experiments or procedures to study those aspects. This includes a basic knowledge of the various "tools" at the geneticists' disposal.
3. Interpret data/results from genetics experiments.
4. Draw appropriate conclusions from the results of genetics experiments.
5. Function appropriately in a Team Based Learning context.

Genetics as a discipline consists of a limited number of concepts and tools that can be applied to an almost unlimited number of scenarios. Therefore the main focus of the course will be application of knowledge, including lots of practice, practice, practice!

Distribution of Work

As in every other class, there will be some work you do on your own time and some work we do together in class. Because of our focus on application, the distribution of the work may be different than in your other biology classes.

Work you do on your own time:

Review old concepts from previous coursework and begin to learn new vocabulary words and new concepts by reading and taking notes on textbook chapters.

Practice applying concepts by doing assigned chapter problems, and reading and analyzing one original research paper.

Prepare for group paper analysis by reading one original research paper and attempting to answer analysis questions.

(Total new reading = textbook & 2 papers.)

Work we do together in class:

Clarification - address confusing or challenging concepts in lecture.
- model problem solving approaches in lecture.

Application - apply concepts by solving a multitude of problems from the textbook, doing other types of group exercises, a group paper analysis, and one group research proposal .

Assessment - assess individual readiness for in-class work with Individual Readiness Assessment Quizzes for each chapter.
- assess group readiness for applications with group Readiness Assessment Quizzes for each chapter.
- assess individual application skills with three problem-based Tests.

Learning Teams

Working and communicating effectively in teams is a critical component of almost every adult career and is one of the most important professional skills you will need for your future.

***Attendance is crucial** - Much of our in-class work will take place within your group, or Learning Team; staying home and reading the book on your own cannot replace this learning.

***Participation is crucial** - It is everyone's responsibility to ensure that group work truly represents a group effort.

***Productive group members do the following:** come to class prepared, do your own work on individual assignments, stay focused on the assigned task, encourage and support team members, listen, speak up and share your ideas, give constructive help to teammates, respect other's contributions.

***Most (but not all) of the group work will earn points;** for final grading we will drop the lowest group chapter exercise (not the Group Paper Analysis or the Group Final Research Proposal). We will be using peer evaluations to provide useful feedback on your development of team skills. Peer evaluations will determine what proportion of group points you will earn.

Attendance

In the adult world, if you miss work, others must take over your responsibilities. Professional courtesy includes providing your team with valid excuses for absences on regular class days, as well as taking a turn covering for another person when he/she is absent. (Refer to Collected Homework Problems.) On test days, I'm the one who deserves notification.

Pre-arranged absences for university-sanctioned events (not leaving early for vacations):

1. For RAQ days or the Group Paper Analysis, see me ahead of time to make arrangements for a suitable alternative. In some cases, your group can use your written contributions as participation *in absentia*.
2. Homeworks may be turned in early, turned in on time by a friend, or emailed (or dropped). No late homeworks!
3. Tests may be taken early or made up during exam week; see me ahead of time to negotiate.
4. If you miss a day in which group points are earned (other than the Group Paper Analysis), that score will be your dropped score.

Emergency absences such as illness or family disaster (not leaving early for vacations):

1. If homework problems are due that day, ask someone to bring them in, email them, or just count them as your drops. No late homeworks!
2. If you miss an RAQ, your individual and group RAQ scores will be your dropped scores.
3. If you miss a Test, you may make up the test at our mutual convenience during exam week.
4. If you miss a day in which group points are earned, that score will be your dropped score. This does not apply to the Group Paper Analysis and the Group Final Research Proposal.

If you have a major health or family problem causing multiple missed days, then you or your family must notify the Associate Dean Dr. Snodgrass. He will then communicate the reason for your absence to all of your teachers. In such a case, given an official letter from the Associate Dean, we will negotiate a fair and appropriate way to make up excessive missed work.

Reading Assignments

The textbook is Modern Genetics Analysis 2nd edition by Griffiths *et al*. There is a copy on reserve in the library. We will cover Chapters 1-14. I will post Reading Guides in the portal to help you focus on the important material in each chapter (in order to avoid needless memorizing). Each chapter should be read and the reading guide filled out before the day indicated on the schedule. The Reading Guides are Word documents that form the basis of your notes for this class. Your downloaded copy is your own to modify as you choose – add spaces in which to write or type or draw diagrams.

There will also be two research articles (primary sources) from a scientific journal.

It is reasonable to expect that you remember the relevant material covered in General Biology I. Use your Gen Bio I textbook and notes as needed for review prior to class. I sometimes refer you to specific sections of Campbell's book, but any good introductory biology textbook will do. (The Gen Bio textbook is also on reserve in the library under Gen Bio II.)

Readiness Assessment Quizzes (RAQs)

RAQs are short quizzes (5 - 10 multiple choice questions) on each assigned chapter. Each person will take the RAQ individually in class. Next, the group will take the same test for a group score. Lastly, the group may appeal any question, in writing only, on the form provided.

RAQs are tools that help us in several ways:

1. RAQs serve as accountability tools to help you determine if your personal reading and study has sufficiently prepared you for further work in your group on the application problems. In other words, they provide you with a measurable reward for coming to class ready to work.
2. From the RAQ results, we will easily see what parts of the chapter need more extensive explanation or clarification (lecture) before we begin on the problems.

For the final grade, we will drop the lowest individual and group RAQ score.

Collected Homework Problems

The actual purpose of collecting problems is to reward you for doing them in a timely fashion, when the work will be most useful to your learning, and while there is still plenty of time to ask questions (i.e. not doing several chapter's worth of problems the night before the test!). The typical problem set will include 6 problems. You will be assigned one of those problems as your "teaching" contribution and will present the solution to your team. (See handout Examples of Problem Solutions.)

For educational as well as practical reasons, collected homework problems cannot be received late. Each group will collect the individual problem sets and place them in the group folder for handing in. Out of 14 chapters, we will count 12 problem sets toward your individual grade. (In other words, you have two free "drops".)

If you will be missing class or dropping a given homework assignment, please notify your team so that someone else can cover your "teaching" problem. You can return the favor at a later date.

The turned-in problems represent only the minimum amount of practice needed for D or C grade. If you learn best by repetition and/or of you want to try for an A, then do as every problem (except the skipped ones, of course).

In the back of the textbook, there are answers to some of the chapter problems. For uncollected, unanswered problems, I will be posting answer keys on the portal.

Tests

There will be 3 tests spaced throughout the semester to assess individual problem-solving skills (i.e. not multiple choice). Expect them to be very challenging so that we can accurately determine your personal level of expertise and the range of expertise in the class.

Analysis of a Research Paper

We get to do two paper analyses, one as a team and one individually. This will involve reading a research article and answering a series of questions about the genetics approach and methods used in the article. I will assign the group paper but you get to choose your own individual paper. We will do the group one first; then the individual one won't be as scary.

Research Proposal/Final Exam

The Research Proposal will be done during the 2-hour final exam time. Consistent with the goal of the course, each group will produce an outline of a research plan on a specific area of interest. Each group will produce an overhead transparency showing their succinct outline, including: the question being addressed, a list of experiments, some possible results and possible interpretation. The outlines will be presented to the class.

If You Need to See Me Personally

Office Hours: Specific office hours will be determined by your responses to my survey, but I'm here every day so feel free to make an appointment.

I love to spend time working Genetics problems, so I would be very happy to help anyone who wants to come in for a problem-solving session!

I would be happy to have extra help sessions before tests, but you have to request them.

MYXU Portal

The following materials will be posted in the portal.

- * Reading Guides (Word document – feel free to modify your copy as needed)
- * Key figures for some lectures (Word document – make space as desired, print and bring to class)

- * answer keys to chapter problems (the textbook has answers for some but not all problems) Use these wisely! Don't look at them until after you have attempted to do the problems on your own. Come on, you are adults; you can do this!
- * old tests for practice
- * article for group paper analyses

Academic Honesty:

According to the University Catalog, "The pursuit of truth demands high standards of personal honesty. Academic and professional life requires a trust based on integrity of the written and spoken word. Accordingly, violations of certain standards of ethical behavior will not be tolerated at Xavier University. These include theft, cheating, plagiarism, unauthorized assistance in assignments and tests, unauthorized copying of computer software, the falsification of results and material submitted in reports or admission documents and the falsification of any academic record including letters of recommendation." (my underline)

At my *alma mater*, the University of Virginia, we put it this way "We do not lie, cheat or steal, nor do we tolerate those who do." Note that according to these policies, you are responsible for maintaining your own integrity and for refusing to permit dishonest behavior among your peers. Tolerating cheating in others is just as wrong as cheating yourself.

These policies apply to our class in the following ways:

1. Homework: It is okay to work with a friend(s) to prepare for class. It is also acceptable to refer to the textbook or to a friend to get some hints if you get stuck on an assigned chapter problem; just acknowledge the help on your paper (no penalty).

Remember to consider chapter problems as practice for the tests – ultimately each person must understand how to do the problems alone. Therefore simply copying another's homework answers for credit (including the answers in the back of the textbook) is unacceptable (and stupid!) Be sure that you learn to work the problems by yourself before the test time!

2. Tests and quizzes: On the day of a test or RAQ, you must not discuss the test or RAQ outside of class until 1:00 PM (after everyone has taken the test). In order to reinforce your commitment to academic integrity, you will sign the following pledge on each individual test:

"On my honor, I pledge that I have neither given nor received any aid on this exam" your signature

(This is a modified version of the pledge used at Virginia.)

3. Individual Paper Analysis: This individual assignment is for you alone. Do not assume that you may work with others simply because it is an out-of-class assignment; you may not. The reason that this is an out-of-class assignment is so that you may take as much *TIME* as you like.

4. Emergencies: If you have some serious problem or emergency that causes you to be unprepared for a test or assignment, then consult with me to find some options other than cheating.

Grading

There are two major areas on which to base grades: individual performance and group performance. The class will choose the exact percentages of each according to the following guidelines.

	<u>% of total grade</u>	<u>total % input of individual work</u>
1. Individual Performance		
Individual RAQs (1 drop)	__at least 5%	70% - 90% of grade
Individual Assigned Problems (2 drops)	__%	
Individual Tests	__at least 55%	
Individual Paper Analysis	__at least 5%%	
	<u>% of total grade</u>	<u>total % input of group work</u>
2. Group Performance		
Group RAQs (1 drop)	__%	10% - 30% of grade
Group Exercises (1 drop)	__%	
Group Paper Analysis	__%	

Grading Scale:

A = 93 – 100% including at least 80% on the Individual Paper Analysis and 80% on the Final Group Proposal,
A- = 90 – 92%, B+ = 87 – 89%, B = 83 – 87%, B- = 80 - 82%, C+ = 77 – 79%, C = 73 – 76%, C- = 70 - 72%, D+ =
67 – 69%, D = 60 - 66%, F = 59% and below.

SCHEDULE (2008)

T	Jan. 15	Intro, Chapter 1	RAQ (practice)
R	Jan. 17	Chapter 2	RAQ
T	Jan. 22	Chapter 3	RAQ
R	Jan. 24	Chapter 3	
T	Jan. 29	Chapter 4	RAQ
R	Jan. 31	Chapter 4	
T	Feb. 5	TEST 1	
R	Feb. 7	Chapter 8	RAQ
T	Feb. 12	Chapter 8	
R	Feb. 14	Winter Holiday	
T	Feb. 19	Chapter 8	
R	Feb. 21	Chapter 5	RAQ
T	Feb. 26	Chapter 5	
R	Feb. 28	Chapter 6	RAQ
T	Mar. 4	Chapter 6	
R	Mar. 6	Chapter 6	
		Group Paper Analysis	
T	Mar. 11	TEST 2	

R Mar. 13 Chapter 14 RAQ

Mar 17 – 24 SPRING – EASTER BREAK

T Mar. 25 Chapter 14
R Mar. 27 Chapter 7 RAQ

Due date for Individual Paper Choice (Turn It In.com)

T Apr. 1 Chapter 7
R Apr. 3 Chapter 10 RAQ

T Apr. 8 Chapter 10
R Apr. 10 Chapter 12 RAQ

T Apr. 15 Chapter 9 RAQ
R Apr. 17 Chapter 9

Turn in Indiv. Paper Analysis

T Apr. 22 **TEST 3**
R Apr. 24 Chapter 11 RAQ

T Apr. 29 Chapter 11
R May 1 Chapter 13 RAQ

Exam Day: Final Exam Time = Research Proposal

10:00 class R May 8 8:30 – 10:20
11:30 class T May 6 10:30 – 12:20