

BISC 336: Genetics
Spring, 2018

Course objectives: Why do children look like their parents? How is the information needed for living beings to survive, thrive and play soccer encoded in a cell? Where is the smart gene located? How can we identify individuals that might be susceptible to disease? How is it that all humans are 99.999% alike, yet very different? Why is cancer such a difficult disease to defeat? How can we use observation of patterns as well as planned or unplanned experiments to deduce the answers to these questions? BISC 336: is an introduction to these questions, the methodology we are using to answer them and a few answers.

Learning goals:

- Design experiments and analysis results, using genetic techniques and methodology to answer biological questions.
- Gain an excitement and appreciation for genetics as a foundation to understanding the biological world
- Explain core concepts of inheritance
- Engage and question our understanding of genetic concepts, determining what we know and don't know
- **What are your goals:** _____

Topics:

Section 1: Patterns of Inheritance: Mendel-postulates, molecular basis of postulates, Recombination, Expansions on Mendel

-Techniques: Probability, Crosses, Epistasis, Complementation

Section 2: Population genetics, Mutation, Genetic code, Genomes

-Techniques: Sequencing technologies, Reverse genetics, Forward genetics

Section 3: Case studies: (Suggestions from Students welcome) – Possibilities include, Non-coding regions of the genome, Sex-determination, Cancer, Developmental biology, GMOs, GWAS, iPS/Stem cells, Bacterial genetics

(For a more detailed lecture list-see the website.)

Name	E-Mail	Office Shoemaker	Lab Sections
Dr. Joshua Bloomekatz Instructor	josh@olemiss.edu	Shoemaker 208	
Dr. Linda C Mota Lab Coordinator	lcmota@olemiss.edu	Shoemaker 525	
J.P. Lawrence	jlawrenc@go.olemiss.edu	Shoemaker 504	1 (M 9-11 am) 2 (M 11-1 pm) 3 (M 1-3 pm)
Chaz Hyseni	chyseni@go.olemiss.edu	Shoemaker 302	4 (M 3-5 pm) 5 (M 5-7 pm)

Lectures: TTh: 4:00-5:15pm, Bishop Room 209 Auditorium

Lab sections: Lab sections provide a hands-on application of some of genetic concepts and techniques we will engage in lecture. They also provide a small environment in which to ask questions, teach others, and engage in small group work. The laboratory segment of BISC 336 is designed to illustrate the principles of genetics that you are learning in the lecture. Students are expected to have read the lab-related material before lab.

Lab sections start the second week of class. You are expected to attend the Lab section you have enrolled in. YOU are responsible for printing handouts, homework, and other related material BEFORE LAB through Blackboard. Posted protocols will be accompanied by e-mails.

- **Monday 9:00 -10:50am Shoemaker 527 J.P. Lawrence**
- **Monday 11:00 -12:50pm Shoemaker 527 J.P. Lawrence**
- **Monday 1:00 -2:50pm Shoemaker 527 J.P. Lawrence**
- **Monday 3:00 -4:50pm Shoemaker 527 Chaz Hyseni**
- **Monday 5:00 -6:50pm Shoemaker 527 Chaz Hyseni**

Midterms: Thursday, Feb. 22, 2018 in class
Tuesday, April 10, 2018 in class

Final: Wednesday, May 9, 2018 4pm Bishop Room 209 Auditorium

Prerequisites: BISC 160, 161, 162, 163: Minimum grade C

Textbook: Essentials of Genetics, by Klug, Cummings, Spencer and Palladino, 9th edition. Optional but recommended is the study guide and solution manual.

Course website: Blackboard No material will be handed out in class. All useful information regarding the class will be uploaded here include, slides from lectures, problem sets, etc.

Contact information:

-For administrative questions regarding enrollment contact: biology@olemiss.edu
-All other questions

1. Check this Syllabus for the answers
2. For content questions regarding lab or lecture first check/ask the class discussion boards or the FAQ section of the website.
3. Otherwise content questions regarding labs should be addressed to the T.A.s or the Dr. Mota. Content questions regarding lecture should be addressed to Dr. Bloomekatz.
4. Please include "BISC 336 and your name in the subject heading"

Clickers: You will need a clicker from Turning Technologies for this course. Engagement and proactive thinking are essential components of learning and mastering the material. These activities are facilitated by clickers. Clicker questions will be asked in each lecture and you will receive points for answering. There will be enough clicker questions throughout the quarter to reach the maximal points, even if you forget your clicker on occasion. You must register your clicker in order to receive credit for answering questions. You can register your clicker on the Blackboard website.

Attendance and engagement policy:

- You must register your attendance within the first two weeks, by using the in-class Attendance Verification interfaces. This is required to confirm your enrollment in the course. Without this you may be automatically dropped.
- You must attend class. Engaging with the material during lecture and as part of active learning is essential for mastering the material. It is important to hear the material explained in different ways and to connect the material to your previous knowledge. Reading the text is not sufficient. Exams will be based on the material covered in lecture. Clickers questions are provided in class to incentive in class engagement.
- You must engage with the material outside of class. Genetics is difficult. It will not be sufficient to engage with the material in class. You must also engage with the material outside of class. Along with doing the problem sets, you need to engage with the lecture and reading material outside of class. Ask how do we know this information? How would I use this information to conduct an experiment? How does this information connect to other biological concepts?
 - Create a routine in which you are engaging with the material on a daily basis.

Problem sets: Solving problems and designing experiments is essence of Genetics. Problem sets will be assigned at the beginning of each week and will be due on Tuesday prior to lecture, after lecture the answer key will be posted.

Grading:

15% Midterm 1	(150 pts)
15% Midterm 2	(150 pts)
30% Final	(300 pts)
25% Laboratory section	(250 pts)
10% Problem sets	(100 pts)
5% Clickers	(1 pt/question to a max. of 50pts)

92.5 – 100%	A	79.5 – 82.4%	B-
89.5 – 92.4%	A-	77.5 – 79.4%	C+
87.5 – 89.4%	B+	69.5 – 77.4%	C
82.5 – 87.4%	B	59.5 – 69.4%	D
		<59.5%	F

- Standard rounding rules apply.
- Curving: The course will not be graded on a curve. Together (instructors and students) with hard work, I believe at least 50% of the class should be able to achieve As and Bs. If necessary, these cutoffs will be adjusted downward to compensate for variability in exam difficulty.

Laboratory-specific logistics

Grade Breakdown

Each assignment has an associated “weight.” This reflects the importance/influence of the assignment on your overall lab grade. We will be working in groups of 4, each table splitting in two groups. This will be the group you work with in all presentations as well. Although working in groups can facilitate teamwork, please make sure you are comfortable with all related material in preparation for quizzes.

<u>Assignment</u>	<u>points (Weight)</u>					
Weekly Lab Quizzes (total 10)	10	x	6.25	=	62.5	(25%)
Fly Figure	1	x	25	=	25	(10%)
GMO Figure	1	x	25	=	25	(10%)
Pick a Bug Figure	1	x	25	=	25	(10%)
Presentation	1	x	25	=	62.5	(25%)
Participation			50	=	50	(20%)

Total Points = 250 pts

Presentation

There will be a group presentations during the semester. Every group member will need to contribute equally to a 10-15 minute powerpoint presentation. Presentations will be graded/constructively critiqued by your TA as well as your peers. It is highly recommended to pay attention and make notes as a result of material being fair game for questions on the lab semester exam.

Figures

At the end of the semester you will submit a figure assignment regarding information you have concluded from the Fly experiments, GMO, and Pick a Bug exercises. To assist the process, two lab periods are dedicated towards relaying relevant information to be included, overall layout/design, things NOT to do, and most importantly giving you time to build the assignment during the semester and NOT waiting until the end. Although the work during the semester is done as a group, this figure assignment is to be made in **your own words** (e.g., DO NOT PLAGIARIZE).

Weekly Lab Quizzes

Lab quizzes will be given most weeks at the start of lab. These will be short and only take place for the first 10 minutes of lab (if you are late, you miss out). They will cover

material previously covered in labs. Each quiz will count equally to the overall 25% allotted for the weekly quizzes.

ATTENDANCE IS REQUIRED

Through attendance records and quizzes, your attendance will be recorded. If you know you will be absent due to a court date, university approved function, etc., you are expected to contact your TA as soon as possible. In the case of absence, it is your responsibility to maintain contact with your group members and to be certain you do not miss any information. If the absence is excused ahead of time, you will have the opportunity to attend another lab section. You will have **until the end of the week** to submit documentation. If official documentation is not submitted by the end of the week (whether hard copy or electronic), your absence will be regarded as an unexcused absence. Approval of excused lab absence is done per **Dr. Linda Mota**. Each unexcused absence will incur a 5% reduction of your participation grade. If you arrive late to a lab quiz/exam, you will not be given additional time.

Make up quizzes:

Students can make up the lab quizzes only if they have proper documentation regarding their absence (i.e. doctor's note, court date, death certificate). Unexcused absences will result in a score of 0 for that quiz/exam.

Materials:

You may need calculators throughout the course and will need to bring them for the lab quizzes. Phones cannot be used as calculators for the quizzes.

Make up Labs:

You MAY have the opportunity to make up a lab if an absence is excused by attending an earlier or later lab. If this is the case to ensure enough materials are available for you in a new lab, you **MUST** contact your TA as well as the TA of the lab you would like to attend. Without doing both, you will not be allowed to attend the make-up lab. **YOU WILL NOT BE ABLE TO MAKE UP MISSED LABS WITHOUT VALID DOCUMENTATION.**

Tips on how to do well: BISC 336 (like many other university courses) is complex enough to reward the student who gives some thought to how to take it. The most important trick is to keep up, each lecture builds on the one before. So, you need to master the previous material to understand the next set. Unlike other courses, genetics is about problems; doing problems, figuring out which experiments can be used to address different problems, etc. The more problems you do the better you'll grasp the concepts.

The following practices can help you succeed:

- **Engage with the material!** Ask questions, pull and push at the material, figure out why this or that is done that way, make connections between different parts of the material, figure out how different concepts can be used to answer other questions.... (talk with the TAs, talk with other students)
- Assess yourself frequently and accurately! Try to teach a topic to a friend or draw out an important figure from memory. Don't ask "do I understand this?" Ask "how would I explain this?"
- Be present and take good notes during lectures. Then take notes on those notes. Re-organizing them so it makes sense to you.
- Don't fall behind, figure out if you don't understand something and then figure out why.
- Use the textbook and internet resources (see the Links Section of the course) as reference material to help you better understand lecture material. It's rarely beneficial to read a textbook like a novel from front to back.
- When you study, keep a running list of questions and issues you are having with the material. Bring those questions to office hours or a study group.
- It's better to study for short bursts often than in massive cramming sessions. Change your study area occasionally.

Watch these videos linked below for even more effective study tips:

<https://www.youtube.com/watch?v=p60rN9JEapg>

Since your grade will be decided entirely from your final score and not based on how you compare to other students in the class, it will never hurt you to help fellow students. In fact, research on learning has shown that whether you are on top of the material or are having a hard time understanding the concepts, you will improve your learning by discussing the material with other students. Participation in study groups and in peer discussion of clicker questions is therefore, highly recommended.

Laptop computer policy: Taking notes on a Laptop is a bad idea. Instead of synthesizing the material for better understanding, students tend to just take notes word-for-word. Audiotaping but not video-recording is allowed, if you're worried about missing material. The lecture presentations will also be available online. Use the lecture time to engage the material, synthesizing the important components.

<https://www.nytimes.com/2017/11/22/business/laptops-not-during-lecture-or-meeting.html>

<https://www.nytimes.com/2014/11/02/education/edlife/take-notes-from-the-pros.html>

Regulations Governing All Examinations: The exam will consist of multiple choice, short essay, short answer, and quantitative or graphical material designed to test your ability to synthesize information presented in the lectures and readings. The midterm exam will be based on material up to the lecture preceding the exam unless announced otherwise in class. **You must have a photo ID to turn in your exam.**

A student's failure to appear for an examination without an acceptable excuse, inability to present valid identification, absence from the room during the course of an examination without the consent of the examiner, or attempting any portion of an examination without submitting his or her answers shall result in failure of the examination.

A final examination, to be given at the time posted in the examination schedule, is required in each undergraduate course, unless the appropriate chair and dean have approved an exception. A student who has three or four final examinations in one day may arrange with the course instructor to take the noon or 7:30 p.m. examination at another time. In order to give a final examination at any time other than that shown in the posted examination schedule, an instructor must have prior approval of the department chair and dean.

The use of cell phones or any other electronic devices is not permitted during exams. Cell phones or other communication devices must be turned off and stored before entering the lecture hall at all times. Use of a cell phone, PDA, or other similar electronic devices during an exam, quiz or assignment is grounds for receiving a failing grade.

Make-up policy:

-If you have an anticipated absence; for example for an official University function, religious observations or scheduled medical procedure, you must inform Dr. Bloomekatz ASAP, preferably at least 1-2 week before the exam.

-If you have an unanticipated absence, i.e. a medical emergency, you must present appropriate documentation to justify the absence. Without such documentation, you will receive a zero for that exam.

At the instructors discretion; you will be allowed to make-up the missed points. In most cases you will not make up the exam, but everything else in the course will be graded proportionally higher. For a missed final with valid documentation, you will be issued an incomplete grade, which can then be made up with the instructor after the end of the quarter.

Anticipated or unanticipated laboratory assignments/exams will be handled by Dr. Mota.

Otherwise, it is not possible to re-take an exam. The ONLY recourse to receive a higher grade is to successfully submit a regrade request on an exam.

Regrades: It is your responsibility to check your exam for clerical errors in grading. If a grading error has been made, you should submit a re-grade request to Dr. Bloomekatz by one week of return of the exam. Write a concise description of the alleged error on a separate, attached piece of paper. No re-grades are possible for exams written in pencil or non-permanent ink. Students who submit exams for re-grading understand that we may (1) re-grade the entire exam, and (2) compare the submitted paper to a scanned/photographed copy of the original exam answer. Re-grade requests must be made directly to Dr. Bloomekatz within one week after graded exams are made available. If the re-grade request is valid and it affects the letter grade of the student in the course then Dr. Bloomekatz will change your course grade.

Students with Disabilities: Students requesting accommodations and services due to a disability for this course need to contact the Office of Student Disability Services (662-915-7128). SDS will then provide the student with an Instructor Notification of Classroom Accommodations form. Please contact the instructor in advance, with this form, so they can arrange reasonable accommodations. Advance contact is necessary for the appropriate planning of reasonable accommodations. For laboratory accommodations, students with disabilities, which have been verified through the [Office of Student Disability Services](#), need to contact Dr. Linda C. Mota at the beginning of the semester to discuss their individual needs for accommodations.

It is University policy to provide, on a flexible and individual basis, reasonable accommodations to students who have disabilities that may affect their ability to participate in course activities or meet course requirements.

Academic Integrity: Academic dishonesty will not be tolerated in this course. According to UM policy, academic dishonesty includes:

- taking an exam for another student
- allowing another student to take an exam for you
- copying another student's work on an exam
- allowing another student to copy your work on an exam
- altering a graded exam and submitting it for a regrade.
- Rearranging the sequence of words or replacement of words is still plagiarism just as improperly citing (or lack thereof) a source or direct usage of information without citation. Whether done maliciously or "innocently," plagiarism is considered a form of cheating and will not be tolerated.

Since clicker questions earn you course credit, responding to them using another person's clicker will also be considered an act of academic dishonesty. If a student is found using more than one clicker, these clickers will be confiscated immediately. Any student caught cheating or suspected of cheating will be reported to the Dean of the

student college. And Strict procedure will be followed. These can be found here
<https://secure.olemiss.edu/umpolicyopen/index.jsp>

Registering to BISC 336 and the corresponding lab section translates to full recognition and acknowledgement of the expectations, policies, guidelines, and information stated above.

This syllabus is subject to change at the discretion of the instructor to accommodate instructional, and/or student needs.

Last modified: Tuesday, February 6, 2018