

BISC 336: Genetics
Spring, 2020

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 inheritance 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 (geneticists) 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: Foundations of Genetics: Mendel-postulates, molecular basis of postulates, patterns of inheritance, recombination,
-Techniques: Probability, Crosses, Epistasis, Complementation
Section 2: Methodology: Human genetics, Animal models,
-Techniques: Population genetics, GWAS, Sequencing technologies, Reverse genetics, Forward genetics
Section 3: Gene regulation: Non-coding regions of the genome, Sex-determination, Cancer, Developmental biology,
(For a more detailed lecture list-see Blackboard.)

Name	E-Mail	Office hrs
Dr. Joshua Bloomekatz Instructor	josh@olemiss.edu	Shoemaker 208
Dr. Linda C Mota Lab Coordinator	lcmota@olemiss.edu	Shoemaker 525 By appointment
Xia Li	xli13@go.olemiss.edu	By appointment
Chaz Hyseni	chyseni@go.olemiss.edu	By appointment
Laura West	lrwest@go.olemiss.edu	By appointment

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

Midterms: Thursday, Feb. 18, 2020 in class
Tuesday, April 7, 2020 in class

Final: Wednesday, May 6, 2020 4pm Bishop Room 209 Auditorium

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

Required:

1. **A TopHat™ account and software on a smartphone, tablet, or laptop.** To register, go to: <https://app.tophat.com/register/student/> and follow instructions there (**join code: 359444**; cost: \$30/semester (suggested), \$48/year, \$96 for 5 year license). We will be using this software for lecture activities, class polls, quizzes, etc. Please come to class prepared to participate (for course points). **We will start using TopHat on Tuesday Jan 21.**
2. Problem sets will be deployed through TopHat.
3. **Three Scantron forms F-289-PAR-L for exams.** These Red forms (<http://bit.do/scantronF289>) are available from the Ole Miss Bookstore. You will need one for each exam + the final.
4. **Calculator and #2 pencil(s)** for exams.

Textbook: Essentials of Genetics, by Klug, Cummings, Spencer and Palladino, 10th 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. 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.
 3. Please include "BISC 336 and your name in the subject heading"

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. Questions are provided in class to facilitate in class engagement.

- You must engage with the material outside of class, routinely. Genetics is difficult. It will not be sufficient to simply go to class only. 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. Do not copy another student's problem set, this is plagiarism.

Grading:

15% Midterm 1	(150 pts)
15% Midterm 2	(150 pts)
25% Final	(250 pts)
25% Laboratory section	(250 pts)
15% Problem sets	(135 pts)
5% in class questions	(1 pt/question to a max. of 65pts)

2.5 – 100%		9.5 – 82.4%	-
9.5 – 92.4%	-	7.5 – 79.4%	+
7.5 – 89.4%	+	9.5 – 77.4%	
2.5 – 87.4%		9.5 – 69.4%	
		59.5%	

- Standard rounding rules apply.

Laboratory-specific logistics

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.

Description: 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. **YOU are responsible for printing handouts, homework, and other related material BEFORE LAB through Blackboard. Posted protocols will be accompanied by e-mails.**

Overall Lab Objective

- 1) Develop knowledge of genetics through laboratory experiments revolving around Mendel (Classical) genetics, Molecular Genetics, and Sequencing Technology.**
- 2) Improve and reinforce laboratory technical and critical thinking skills.**

Expectations: It is expected that you understand the fundamentals involving biological concepts, definitions, and vocabulary (this includes terminology related to Mendelian inheritance material). Secondly, it is expected that you attend every lab **on time** and **prepared**. This includes printing out the relevant material for the lab of the week. TAs will offer an office hour for any questions relating to lab material, by appointment. These office hours will be held in the respective TA's offices.

Students with Disabilities: The University of Mississippi is committed to the creation of inclusive learning environments for all students. If there are aspects of the instruction or design of this course that result in barriers to your full inclusion and participation, or to accurate assessment of your achievement, please contact the course instructor as soon as possible. Barriers may include, but are not necessarily limited to, timed exams and in-class assignments, difficulty with the acquisition of lecture content, inaccessible web content, and the use of non-captioned or non-transcribed video and audio files. If you are approved through SDS, you must log in to your Rebel Access portal at <https://sds.olemiss.edu> to request approved accommodations. If you are NOT approved through SDS, you must contact Student Disability Services at 662-915-7128 so the office can: 1. determine your eligibility for accommodations, 2. disseminate to your instructors a Faculty Notification Letter, 3. facilitate the removal of barriers, and 4. ensure you have equal access to the same opportunities for success that are available to all students."

Plagiarism & Cheating: There is a **zero tolerance policy** for plagiarism and cheating. Rearranging the sequence of words or replacement of words is considered 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. All parties involved will receive a 0 for that assignment. If a presentation is found to commit plagiarism, every group member will receive a zero for

the presentation.

Lab 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.

Assignment	x	Weight=	Weighted points
Lab Notebook	x	0.25 =	<u>62.5</u>
Lab Report 1	x	0.10 =	<u>25</u>
Lab Report 2	x	0.10 =	<u>25</u>
Lab Report 3	x	0.10 =	<u>25</u>
Presentation	x	0.25 =	<u>62.5</u>
Participation	x	0.20 =	<u>50</u>

Total Points = 250 pts

Assuming attending all labs

Presentation: There will be a group presentations during this 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.

Lab Reports: At the end of each module you will submit a lab report regarding information you have concluded from the exercises. To assist in the process a lab notebook will be kept individually where feedback will be provided by your TA as well as your peers. Although the work during the semester is done as a group, this lab report assignment is to be made in **your own words** (e.g., DO NOT PLAGIARIZE).

Lab Notebook: Lab notebook must be kept individually. You will turn in a lab notebook entry at the beginning of the lab for each week. Further instructions will be provided by the TA

ATTENDANCE IS REQUIRED: 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**. Four unexcused absences will incur a 0% participation

grade. If you continuously arrive late to lab your participation grade will be affected.

Materials: You may need calculators throughout the course and will need to bring them for the lab.

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=p60rN9JEapq>

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>

Diversity and inclusion: The ideal scientist strives to keep an open mind and to look at questions from all different perspectives. That is why integrating a diverse set of experiences is important for a truly comprehensive understanding and study of biology. However, science is conducted by humans and thus has not always met this ideal, especially historically where formal science and science education has often been restricted to a subset of perspectives. This is true for science teaching as well. As principal investigators and science educators we try to create an environment that supports a diversity of thought, perspective and experience. Since this is a continually evolving process we welcome your feedback (you can either contact us electronically, in person or anonymously). If you prefer to speak with someone outside of the course, Katrina Caldwell, the Vice Chancellor for Diversity and Community Engagement (kmcaldw1@OleMiss.edu) is an excellent resource or the Ombuds office (ombuds@olemiss.edu). Finally, as a participant in the course and in course discussions, it is also your responsibility to honor and integrate a diverse set of perspectives and identities.

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.

Regulations Governing All Examinations: The exam will consist of multiple choice, 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. Bring your **student ID, a #2 pencil(s), a calculator, and one Scantron form F-289-PAR-L** (<http://bit.do/scantronF289>) to every exam. **Other than calculators, no electronic devices will be allowed during exams** (this includes cell phones—put them away).

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 instructor's 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.

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.

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 inclass questions earn you course credit, responding to them using another person's account will also be considered an act of academic dishonesty. 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 for 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: Monday, January 20, 2020