Syllabus
BIO 304 Principles of Genetics
Spring Semester 2012
Instructor: Dr. Pete Mirabito, Associate Professor (pmmira00@uky.edu)
Lab Coordinator: Dr. Jennifer Osterhage, Lecturer (jloste0@uky.edu)

Pete Mirabito’s Office hours:
Room 308 from 9-11 on Wednesdays (echos of this hopefully available)
Immediately after class on Tuesdays until 4:15 in room 319
Questions answered by Twitter or Bb posts if too large for Twitter
Other times on Mondays or Fridays in room 319 by appointment only – Tweet or email your request

My primary means of contacting you will be via Twitter. Follow me @pmmira00. I apologize in advance for personal twitters that you may be subject to but these will be minimal.

You may contact me by Twitter or email.

Lecture: Tuesdays and Thursdays 2:00 to 3:15 PM Room 116 T.H. Morgan Bldg

Labs: Section 4 Wednesday 11 to 1:50 (Dr. Jennifer Osterhage)
Section 5 Wednesday 2 to 4:50 (Teaching Assistant, Wen Wen)
Section 6 Friday 2 to 4:50 (Teaching Assistant, Martin Striz)
Section 7 Tuesday 5 to 7 (Teaching Assistant, Dustin Perry)
Section 8 Thursday 5 to 7:50 (Teaching Assistant, Tori Diersen)

Required Text: Concepts of Genetics, 9th edition, Klug, Cummings, Spencer and Palladino, Pearson
Benjamin Cummings

Course web site: http://tinyurl.com/9obdmp

Pre-requisites: BIO 148, BIO 152, BIO 155, CHE 107, CHE 115

Course Description (also see Class Schedule): This is a sophomore-level course that should provide you with the knowledge and analytical skills needed to understand the principles of modern genetics and apply them to appropriate situations in your personal and professional lives. You should gain an understanding of the fundamental concepts of genetics as they pertain to the nature of genes, genomes, and chromosomes, the mechanisms of recombination and mutation, and the patterns of Mendelian and non-Mendelian inheritance. I emphasize examples from human genetics to illustrate and reinforce genetic principles, however; examples from classic laboratory genetic research organisms will also be covered.

Grade components:
Homework 10%
Lab Write-ups 10%
Clickers 10%
Exam 1 15%
Exam 2 15%
Exam 3 15%
Final Exam 25% (final is ¼ on material since exam 3 and ¾ cumulative)
Bonus Points 3.0% possible for ungraded assessments, completing online surveys, bonus clicker days
**Final Letter Grade:** Your letter grade will be **no lower than** the following: 
90 or above = A, 80 to 89 = B, 70 to 79 = C, 60 to 69 = D, and below 60 = E. The scores for each letter grade may be adjusted downwards to achieve a normal distribution centered on middle “C”.

**Grades will be posted on Bb or the class web site using your clicker id number.**

**Homework (10 % of your final grade):** Each Thursday (except for days after exams) you will be required to turn in the original copy of YOUR HAND-WRITTEN answers to homework problems. Homework assignments will be posted on the course website and handouts out in class. Homework assignment will involve solving problems similar to those in the textbook. INCLUDE YOUR NAME AND SECTION NUMBER ON YOUR HOMEWORK.

Homework assignments are due **at the beginning of Thursday lectures** (see class schedule) and should be placed in stacks by section at the front of the room corresponding to your lab section. Each homework problem will be graded as follows:
- full credit = 10 points for the correct answer and evidence for how the answer was obtained
- partial credit = 5 points for an incorrect answer but evidence of a reasonable effort to obtain a solution
- partial credit = 5 points for a correct answer but insufficient evidence for how solution was obtained
- no credit = 0 points for an incorrect answer and no evidence of a reasonable effort to obtain a solution

Answer keys to the problems will be posted on the class web site. Your homework assignment will be graded by your TA and returned to you as soon as possible, but will not contain significant detailed feedback from the TA. If you have questions or concerns, compare your work and the score to the answer key. If you feel that your answer was misunderstood or that your score is not correct, write an explanation and turn the homework in to Dr. Mirabito for a re-grade.

**There are NO acceptable excuses for missed or late homework, including being absent from class.** If you cannot attend class on a day when homework is due, email your TA an electronic .pdf file containing your scanned, HANDWRITTEN homework by start of class time on that Thursday. **NOTE:** I will throw out the lowest homework grade for each student, including a zero due to a late missed assignment. In other words, you can mess up one homework assignment and still receive full credit for homework.

**Clickers (10% of your final grade):** Automated student response system (clicker) questions will be included in most lectures and your responses recorded. There will be two types of clicker questions.

- **Clicker Questions at the beginning of lectures on Tuesdays to assess whether you did learned the meaning of key terms and concepts assigned for that lecture.** They will be based on the key terms and concept lists posted on the web site for that week. These clicker questions will be graded 5 points for the correct answer, 2.5 points for any answer and zero points for no answer.

- **Clicker questions on Thursdays to promote student participation during lecture and help me assess student learning.** They will be based on key terms and concepts, lecture material, problem solving in class, or class discussion. These will be graded 2 points for the any answer and zero points for no answer.

Your percent score for EACH WEEK will be tabulated and used to calculate your overall clicker score for the course.

**There is no way to “make-up” clicker points, however; I will drop your two lowest clicker-day scores.**

**Exams 1, 2 and 3 will include three parts: TOTAL POSSIBLE POINTS PER EXAM = 70**
- 15 fill-in-the-blank questions (2 pts each) that focus on the key terms concepts assigned
- 4 problems or short essay questions, similar to those assigned to you for homework and in laboratory write ups (10 points each)

**Exam results and answer keys:**

Exam grades will be posted on the course website, listed by your clicker ID number. **Answer Keys will**
be posted in .pdf format on the web site and will include the correct answers as well as information to help you understand the how each problem solving/short essay question was scored.

**Detailed comments WILL NOT BE INCLUDED on the test returned to you.** Compare your exam to the Answer Key and, if you find mistakes or wish to argue for more points on one or more questions, **WRITE** your argument out on a separate piece of paper, staple that paper to the test, and turn it in for a re-grade. I will review your test and get it back to you as soon as I can. You will be allowed one re-grade per test. Re-grade requests can be submitted by the beginning of lecture, Tuesday December 6th.

**Final Exam:**
The final exam will be a two-hour, partially cumulative exam that will follow the format of exams 1, 2 and 3 except that it will be twice as long (30 fill-in-the-blanks, and 8 problems). One quarter of the final will cover new information since exam 3 and the remaining will cover material from the whole semester, including laboratory write-ups. The graded final will be available as soon as possible outside my office, room 319 of the Biology building. The key to the final will be posted on the course web site and you are welcome to review the graded exam and turn it in for a re-grade at the end of the semester.

**Make-up exams:** Make-up exams will be held for students who miss an exam due to an acceptable excuse as defined in the University Bulletin. Make-up exams for exams 1, 2 and 3 will be given on dates indicated in the class schedule. Contact me by email to arrange to take the make-up exam. The make-up exam for the final will be given after the semester is over at a time to be arranged. Students who miss the final will be given an incomplete for the course, which will be converted to a letter grade after completion of the final.

_If you know of university sanctioned events (intercollegiate sports or other professional engagements) that will cause you to miss an exam, then meet with me immediately to make special arrangements for completing the course on time._

**Reporting of D and E grades Prior to Midterm:**
Your test and homework scores will be available online listed by your clicker number at the course web site throughout the semester. Projected letter grades (based on scores from tests and homework) will be included prior to midterm. I will use the grading scale and curving strategy described above to determine your projected letter grade. You should use these projected letter grades as a reasonable assessment of your performance in the class up to that point, however; remember that your final letter grade may differ from your midterm projected letter grade.

Regrade Requests: You may submit requests for regrades of homework assignments or exams.

To submit a regrade request for a homework assignment, write your argument for the regrade on a separate piece of paper, staple it to the homework, and turn it in to Dr. Mirabito in lecture, office hours, or drop it off at the Biology office front desk and ask that it be put in my mailbox. **DO NOT ALTER THE GRADED HOMEWORK ASSIGNMENT ITSELF – THAT IS CHEATING AND WILL EARN YOU A ZERO FOR THE HOMEWORK AND A POTENTIAL TRIP TO THE ACADEMIC OMBUD.** Homework regrade requests must be made within a week after the assignment is made available to you by your TA.

To submit a regrade request for an exam, write your argument for the regrade on a separate piece of paper, staple it to the exam, and turn it in to Dr. Mirabito in lecture, office hours, or drop it off at the Biology office front desk and ask that it be put in my mailbox. **DO NOT ALTER THE GRADED EXAM ITSELF – THAT IS CHEATING AND WILL EARN YOU A ZERO FOR THE EXAM AND A POTENTIAL TRIP TO THE ACADEMIC OMBUD.**

**Cheating:**
All clicker questions at the start of class on Tuesdays and exams are “closed-book”, meaning that you are not permitted to use written information in the form of notes, books, or “crib-notes”. **NOTE:** You **may** use a calculator **only** while working on the short answer/problem solving section of an exam. Calculator use in answering the fill-in-the-blank, definition, short-answer questions is **NOT** allowed. Behavior considered cheating in this course includes the following: 1) using notes of any kind during a test or exam; 2) copying from other students during tests or exams; 3) talking to other students during tests or exams; 4) using a calculator to help you
answer the fill-in-the-blank, definition, short-answer questions; 5) handing in homework that is not your own work (i.e. plagiarism), 6) using someone else’s clicker, 7) altering a homework or exam and submitting it for a regrade. The minimum penalty for these offences is a zero score for the assignment and may involve reporting you to the academic ombudsman.

**Students with disabilities:**
If you have a documented disability that requires academic accommodations, please see email me immediately. In order to receive accommodation in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, email address jkarnes@email.uky.edu) for coordination of campus disability services available to students with disabilities.

**BIO 304 Laboratory:**
The BIO 304 lab provides hands-on experience with genetic analyses and is meant to reinforce concepts covered in the lectures. Four laboratory projects, each spanning multiple lab meetings, will be carried out. The written information for all the labs will be posted on the lab website ([https://sites.google.com/site/bio304spring/](https://sites.google.com/site/bio304spring/)). Print out the documents for the labs and place them in a binder along with some blank pages, which you should bring to all laboratory classes.

**Your lab grade is based on four factors:** weekly quizzes (2%), lab write-ups (8%), attendance, and participation.

**Quizzes:** Each lab will begin with a 2-4 question quiz that will cover concepts from the previous lab and/or conceptual background for the week’s lab (found in the documents posted on the lab website). If you miss the quiz because you are late to class, you will be unable to make it up unless previously arranged. Quizzes will determine 2% of your overall course grade.

**Laboratory write-ups:** You will complete and turn in a structured report on each lab BEFORE YOU LEAVE. The report will be based on the observations, results, and predictions from that lab period. Take notes on your print-out of the lab and then write your report on pages provided to you by the laboratory instructors. Each question on the write-up will be given 10 points for a complete, correct answer, 5 points for an honest effort, and 0 points for no effort. Write-ups will determine 8% of your overall course grade.

**Attendance:** Laboratory attendance is mandatory: each unexcused absence from the laboratory will result in a 1% reduction in your overall course grade. If you know that you will miss a lab due to an excused absence, you must make arrangements in advance with your TA and lab partner(s) to obtain results or observations from that lab so that you can be prepared for future labs and for test questions that will be based on those labs.

**Laboratory Participation and Etiquette:**
Your TA will make a five point deduction to your write-up grade at his/her discretion for the following:

1. Failure to dress properly for labs. Proper attire includes full-length pants and closed-toed shoes. If proper clothing is not worn to lab, very unstylish cover-ups will be provided.

2. Eating or drinking in lab.

3. Not contributing to group discussions or lab work.

4. Texting, reading or sending email, or web surfing sites not related to class work on computers or CELL PHONES.

5. Leaving early from lab when there is still work to be completed in your groups, such as preparing for a group activity in the next class or completing an assignment as a group. If you are in doubt, ask your TA if you may be dismissed for the day.
6. Coming to class consistently late.

7. Not cleaning up your workstation at the end of lab.

8. Talking while your TA is talking or being disruptive in any other way as defined by your TA.

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<th>Course Learning Goals</th>
<th>Course Learning Outcomes. Students will be able to:</th>
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| Students will understand the terms “gene”, “chromosome” and “genome” | - describe how model organisms have been used to learn about genes, chromosomes and genomes  
- predict the function of a gene from details of its structure  
- propose experiments that could be used to identify or define a gene and predict the experimental results  
- explain how genomes are characterized and analyzed  
- construct a physical map of a gene or chromosome using molecular data  
- analyze genome sequences and identify potential genes  
- argue for and against the statement “genomics has caused us to re-evaluate our criteria for what is and isn’t a gene” |
| Students will understand the relationship between genotype and phenotype | - define dominance, co-dominance and partial dominance and describe hypothetical mechanisms that explain dominance, co-dominance and partial dominance at the molecular level  
- design experiments to differentiate between environmental and genetic contributions to phenotype  
- define incomplete penetrance and variable expressivity and provide hypotheses for how genetic and environmental factors could explain these phenomena  
- explain in general and molecular terms how cells with the same genotype could have different phenotypes |
| Students will know the principles of transmission genetics | - explain the principle of segregation and relate it to meiosis  
- explain the principle of independent assortment and relate it to meiosis  
- predict the proportions progeny and the probability of specific progeny types given the genotypes of parents  
- infer the genotype of parents or determine the probability of specific parental genotypes given the phenotypic proportions of progeny  
- design crosses to determine the genetic basis of a phenotype  
- define the term genetic linkage and relate genetic linkage to physical linkage, chromosome segregation, and recombination  
- construct genetic maps using data from crosses or predigree analyses |
| Student will understand the nature of genotypic variation | - describe mechanisms that ensure the fidelity of DNA replication  
- describe mechanisms that change chromosome structure or number  
- predict the effects of chromosomal abnormalities on gamete formation  
- describe mechanisms that cause changes in DNA sequences and relate those mechanisms to current topics in environmental biology and human health  
- relate genome and gene mutations to gene evolution  
- determine the heritability of complex traits using data from artificial selection experiments and twin studies  
- predict phenotypic distribution of a quantitative trait in a population given genotype frequencies |