BICD 100: GENETICS

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COURSE SYLLABUS

Course Objectives:
This course focuses on fundamental concepts in Genetics. We will take an integrated approach towards understanding the scientific principles that govern the ways in which we inherit genes, how variation in genetic makeup between individuals arises and the effect this has on characteristics of individuals, populations, and on evolution. We will explore the existence of variants or alleles in populations and briefly cover some of the cellular and molecular processes that impact our understanding of genetics (we know about things Mendel did not, back then, and there is no need to start where he did!). We will discuss various genetic systems; viral, prokaryotic and eukaryotic. You also will be introduced to some quantitative techniques used to predict genetic outcomes. Armed with a basic understanding of the fundamental principles, you should be able to apply this knowledge to solving problems for class, exams and in addressing related issues in your lives to come. I wish you the best!

Text: Every quarter I receive innumerable emails asking if older editions or other editions of books are acceptable. It is completely up to you! Most genetics texts cover about the same material in slightly different ways and preferences are a matter of opinion. I have used the texts by Pierce for many years and recently, a departmental decision was made to adopt the text by Klug. I will use materials and figures from many books in addition to these two, as my objective is to provide the best lectures possible. Lecture PowerPoint slides will be uploaded to TED, so if you want to do well come to class regularly! Most lecturers at UCSD will be using the text by Klug from now on, so if you frequently drop classes and retake them with other lecturers (or expect to fail!), it may be important to buy that text in case you do plan on purchasing one.
1. Essentials of Genetics, 7e, William S. Klug et al. (Benjamin Cummings)
2. Study Guide and Solutions Manual for the above text (Benjamin Cummings)

Other recommended genetics books:
3. Genetics: A Conceptual Approach*, 3e* *(4e is now available but 3e will do if cost is a concern)*, by Benjamin A. Pierce (W.H. Freeman & Co.)
4. Solutions and Problem-Solving Manual for this text (W.H. Freeman & Co.)
5. Transmission and Population Genetics, *3e or 4e*, by Benjamin A. Pierce (W.H. Freeman & Co.)

Websites:
1. Text website for Klug (you need to buy access if you don't buy the book): www.geneticsplace.com
2. Website for the Pierce texts (available for free even if you do not buy the book): *http://bcs.whfreeman.com/pierce3e* (*for 4e replace 3 with a 4*)
3. Class Website (TED): For class related materials, access TED at https://ted.ucsd.edu/ using your University username and password. Please check it frequently for announcements. Please post all class related questions on the discussion board on TED. It will be divided into sections according to lecture numbers (Lecture-1, Lecture-2 etc.) so that the TAs can answer questions effectively and everyone can benefit from the discussion.

Lectures: Held Tu Th, 5:00-6:20 pm, in WLH 2001, as per the lecture schedule (see pages 5 & 6). Printable copies of PowerPoint slides will be posted on TED. I shall try to post these materials before each class whenever possible. These files serve only as a guide and often, the presentation in class will contain additional material (copyright issues may prohibit the posting of some slides). You may be tested on anything and everything presented in class. This will include topics and details not necessarily covered in your text and/or on the posted PowerPoint slides, so please plan on attending the lectures if you want to do well! *Your lecture notes are your study guides for the exams.*

TA Discussion Sections and Office Hours: For Spring 2012, we have some highly qualified TAs ready to help you ace this course. The TAs will lead 50 minute sections every week and also hold office hours starting April 9. I have asked the TAs to be available to you during their section times this week as well, just to introduce themselves and answer any questions you may have about the course. TA sections and office hours should provide ample opportunity for you to seek help and get clarifications. Contact details, section times and TAs' office hours and locations will be posted on TED. Attendance at sections is required and all students enrolled in this class should sign up for a section at http://sections.ucsd.edu Section Enrollment will begin at noon on Thursday, April 5 and end at 6 pm on Sunday, April 8. Please check TED for detailed instructions on enrolling. The TAs will post their office hours and locations on TED**. IF YOU DO NOT SIGN UP FOR A SECTION YOU WILL LOSE TWO POINTS. NO EXCUSES. PLEASE DO NOT EMAIL ME OR BEG FOR THESE POINTS AFTERWARDS. JUST DO IT ON TIME! ☺**

For Spring 2012, 5% of your grade depends on active and regular participation in sections, as determined by your TA. If you miss a section, you may make it up during your TA's office hours. Please arrange this directly with your TA.

The lectures focus on concepts. The discussion sections will be based on reviewing concepts covered in class. If you read the text and review your class notes thoroughly *before* seeking clarifications during discussion sections, you will have a good idea of topics that need further explanation and could seek the help of your TA to effectively fill in any gaps in your understanding of the material.

Exams: Your performance in the class will be determined by your scores on exams and a final quiz. There will be three exams (May 10, June 7 and June 14). The score distribution for exams is as follows:

Exam 1 and Finals Part-I (each accounting for 45% of your final score)	90%
Satisfactory section participation and attendance (greater than 75% attendance)	5%
Finals Part - II	5%
Total	100%

Exams will consist of multiple-choice, true/false questions and may also include questions that require short answers.

The Finals Part-II will be based on student group-presentations to take place on Thursday, June 14. Each group will consist of 4 or 5 students, to keep the number of presentations manageable for our allotted time. **Attendance at the finals Part-II is mandatory** but doing group-presentations will be **optional** (but highly recommended) for students who have achieved an A or A+ grade and who wish to demonstrate their

mastery of the subject by researching and presenting a topic of their choice, selected from an article in the news media or a magazine like Scientific American. The goal is to intelligently analyze (using what you have learned in class), discuss and critique whatever you have found for accuracy and present the gist of what you have learned to the class. You will be surprised at what you find out there! Careful analysis of both good and bad articles can be an educational experience (as long as you can tell which is which!). Imagine yourself sitting in class and listening to the presentations. It is good to hear something exciting and relevant to the class and discuss the implications to medicine and/or society when possible but you do not want to be bored with too many unnecessary details! We have only about 2 hours of presentation time before the quiz so each group will have only about 10 minutes to present. There should be NO experimental details like, "5mls of a 1 mM Sodium acetate buffer was then added and the mixture was incubated at 72 degrees for 12 minutes". Your goal is to present something big and worthy of consideration for smart UCSD students near the end of their Genetics course! THERE ARE NO EXTRA POINTS FOR DOING A PRESENTATION; IT IS AN OPPORTUNITY TO DEVELOP RESEARCH AND PRESENTATION SKILLS. The Final Quiz will be based on these presentations, which will bring together concepts learned throughout the quarter. **The Finals Part-II is an exam based on the presentations and is mandatory for everyone enrolled in the class (which means even if you are not presenting you need to be here to listen and then take an exam based on the presentations).**

Exams and Grading policies:

1. Please note that exams will end promptly at the end of the allotted time. You should plan on arriving on time. No time extensions can be granted for late arrivals. Further, in order to preserve the integrity of testing, no one will be admitted to the classroom for an exam 30 minutes after it has begun, **or** after the first student has finished the exam and left the classroom, ***whichever occurs earlier***, no matter what the excuse for showing up late. Failure to take the exam at the assigned time and place will result in a grade of zero. If you are not admitted to the exam, please refer to #2 below for requesting an oral exam.

2. Extraordinary circumstances (hospitalization) preventing you from taking an exam at the scheduled time must be submitted to Dr. Ghiara **in writing** and **must include official documentation in support of the excuse (doctor's note)**. The doctor's note will be verified by a departmental employee and ***if*** *the excuse is accepted*, the make-up will most likely be an ORAL exam given by Dr. Ghiara (but the exact format will be at his discretion).

3. Your pencils, pens and an ID card (student or driver's license) are the only personal items you should have with you during the exam (**Please remember to turn cell phones off and put them away!**). An ID card (student or driver's license) is **REQUIRED** for you to take an exam. You are required to follow all instructions. If you fail to bubble in your name and student ID number (leave out the A, just bubble in the numbers) exactly as it appears on school records you will lose 5 points (NO EXCUSES). Failure to do this routinely delays the processing of scantron forms for the entire class. If your full name and ID are not bubbled in on the scantron form, it will be shredded and you will receive an F in the class. Please do not expect the TAs to manually grade your form because you were too lazy and/or careless to bubble in your name on an exam!

4. All free response questions must be answered in ink. Absolutely no re-grading requests can be accepted if you write your exams with pencils. For scantron forms, use number 2 pencils ONLY.

5. Cheating will not be tolerated and will result in a failing grade for this course. Further, the full extent of disciplinary actions as stated in UCSD's policy on Academic integrity will be implemented. Please review the policy at: http://www-senate.ucsd.edu/manual/Appendices/app2.htm . Actions may be taken for looking at your neighbors' answers, talking or using your cell phone in any way during the exam, failure to establish your ID when turning in your exam, or altering your exam prior to submission for re-grading.

6. Requests to reconsider any grading must be submitted **in writing** along with your exam to one of the TAs *within five days of the exam return date*. Absolutely no requests for re-grading will be accepted after five days *from the time graded exams are first available for your perusal during sections* (not after you get around to it, if that is later than when the exams were first available in sections). Please do not request personal meetings to "discuss grades" as these meetings cannot be granted. Thus, do not alter ANYTHING on an exam you are submitting for re-grading. Any inconsistencies will be considered a breach in academic honesty and will be grounds for failure of the course. There are ABSOLUTELY NO REGRADES ON SCANTRONS. You may NOT make appointments to "just see" your scantron forms. Final exam papers (both Parts I and II will not be returned nor will they be available for review. TA contracts end at the end of the quarter and there is no budget to hire staff to make reviewing papers with students in the large-enrollment classes possible during breaks or subsequent quarters).

7. Final grades will be determined at the end of the course, based on exam scores, section-attendance scores awarded by the TAs and the final quiz. Letter grades will be assigned as follows:

A = 90-100	90-92 = A-	93-97 = A	98 and above = A+
B = 80-89	80-82 = B-	83-87 = B	88 and 89 = B+
C = 70-79	70-72 = C-	73-77 = C	78 and 79 = C+
D = 60-69	F = 0-59		

Classroom Etiquette:

You are encouraged to ask questions and participate in class discussions but all your comments must be directed to the class. Please turn off your cell phones and do not engage in conversations with other students when the instructor or any other student is addressing the class. Given the large class size and the short duration of the class, please be considerate towards other students by not walking in and out of the classroom for water/restroom breaks while the class is in session, unless a medical condition warrants it. If you must leave early, please situate yourself in an aisle seat at the back of the class so that any disruption is kept to a minimum.

How to do well in this course:

1. Read the assigned pages in the text before class. Diagrams and figures are not just "pictures". Carefully study figures and figure legends to make sure you understand what is presented.
2. There is no substitute for attending lectures as I may draw from many different sources and knowledge built over a very long time for the presentation.
3. Participate in class. Teaching and learning go hand-in-hand and your active participation will ensure optimal learning. I will not know what clarifications you need if you don't ask!
4. Attend discussion sections. Go thoroughly prepared to discussion sections and to exam review sessions. The better prepared you are for these sessions, the more you will get out of them.

Welcome to the course. Learn as much as you can from your TAs and me, and GOOD LUCK!

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Section ID: 743958

Lecture Schedule for Spring Quarter 2012

Tu Th, 5:00-6:20 PM, WLH 2001

Please note that you should check this lecture schedule on TED frequently for updates.

	Topic	Chapters (Klug)
Week 1	Introduction to the course	
	DNA as the hereditary material. DNA sequence/chromosomes/genes.	9
Week 2	The Genetic code links genotype and phenotype: mRNA, tRNA, proteins	prerequisites/lecture 12,13
	Brief overview of DNA replication (as relevant to this Genetics course-more details can be found in the text but are not required) Karyotype. Replication/duplication of chromosomes.	1, 10
Week 3	Chromosomal sorting during Mitosis/Meiosis	2
	Gamete Formation/Chromosomal inheritance/	2
	Non-disjunction/Aneuploidy	6
Week 4	Basic Principles of Heredity – 1	
	Dominant/Recessive alleles	3
	Complete dominance, Mendel, Monohybid crosses	
	Application of Probability and Binomial Expansion to Genetic Crosses	3
	Chi-square test	
Week 5	Basic Principles of Heredity – 2	
	Incomplete dominance	3
	Dihybrid crosses, Branch diagrams	
	Sex Determination/ Anomalies	5
Week 6	Sex-Linked Characteristics/	4
	Sex influenced and sex limited characteristics	
	Exam 1 Thursday, May 10	
Week 7	Extensions and Modifications of Basic Principles -1	4
	Lethal alleles, Penetrance and Expressivity	
	Allelic Series, Codominance, Blood groups	
	Extensions and Modifications of Basic Principles -2	5
	Gene Interactions, Cytoplasmic Inheritance,	
	Maternal Effect	
Week 8	Genomic Imprinting	4
	Quantitative Traits/Polygenic inheritance	22

	Pedigree Analysis	3
	Genetic Testing	19
Week 9	Linkage, Recombination and Eukaryotic Gene Mapping-1	7
	Linkage, Recombination and Eukaryotic Gene Mapping-2	7
Week 10	Genetic Analysis and Mapping in Bacteria and Bacteriophages	8
	FINALS Part-I Thursday, June 7	
	FINALS Part-II (7:00 – 10:00 PM) (**Thursday, June 14**)	