BICD 100: GENETICS

Instructor: Dr. Jayant Ghiara

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!

Required Text Bundle:
Genetics: A Conceptual Approach*, Third Edition*, by Benjamin A. Pierce (W.H. Freeman & Co.)
+ Solutions and Problem-Solving Manual

Websites:
1. Text website: *http://bcs.whfreeman.com/pierce3e*
2. Class Website (WebCT): For class related materials, access WebCT at http://webct6web.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 WebCT. 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: MWF, 10:00-10:50 AM, in PETER108 as per the lecture schedule (see pages 5 & 6).
Printable copies of PowerPoint slides will be posted in pdf format, on WebCT. 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.*

Exams: Your performance in the class will be determined by your scores on exams, attendance at sections and a final quiz. There will be three exams (Apr 19, May 12 and Jun 4) and a Final quiz (Jun 7). The score distribution for these requirements is as follows:

Three exams (each accounting for 30% of your final score)	90%
Satisfactory section participation and attendance (greater than 75% attendance)	5%
Final quiz	5%
Total	100%

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

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). ***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 pens and an ID card (student or driver's license) are the only personal items you may have with you during the exam (**Please remember to turn cell phones off!**).

4. All questions must be answered in ink. Absolutely no re-grading requests can be accepted if you write your exams with pencils.

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 available for pickup* (not after you pick them up, if that is later than when the exams were first handed back). Please do not request personal meetings to "discuss grades" as these meetings cannot be granted. Please be advised that exams will be photocopied, front and back, before they are returned to you. 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.

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			

TA Discussion Sections and Office Hours: For Spring 2010, 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 Apr 5. This 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 WebCT by Apr 3.
Attendance at sections is required and all students enrolled in this class should sign up for a section at

http://sections.ucsd.edu by Apr 4. Please check WebCT for detailed instructions. The TAs will post their office hours and locations on WebCT.

For Spring 2010, 5% of your grade depends on active and regular participation in sections, as determined by your TA. The lectures focus on concepts. In sections you will not only review the concepts covered in class but also put in considerable effort in order to develop your problem solving skills. You are responsible for attempting all the questions at the ends of the text book chapters we cover in class. These will be very important for your success in exams.

When attempting the end-of-chapter exercises and problem sets, use the Solutions and Problem-Solving Manual and any additional materials (animations!) on the text website *before* seeking clarifications during discussion sections. This way you will have a good idea of topics that need further explanation and could seek the help of your TA to fill in any gaps in understanding the material.

Classroom Etiquette: It is very important for the success of this class to maintain a safe learning environment as we discuss, often very sensitive, issues. Hence, recordings of any kind are not permitted in this class. 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.
5. Be aware that the genetics you are learning is not just in the books but actually "happening" in and around all of us. It is exciting to note that these sometimes elegant, sometimes complex processes are at work making us who we are! Welcome to the course. Learn as much as you can from your TAs and me, and GOOD LUCK!

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Section ID: 678879

Lecture Schedule for Spring Quarter 2010

MWF 10:00 - 10:50 AM, PETER 108

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

	Topic	Chapter (pages)
Week 1	Introduction to the course	
	DNA as the hereditary material. DNA sequence/chromosomes/genes.	10 (267-278)
Week 2	The Genetic code links genotype and phenotype: mRNA, tRNA, proteins	prerequisites/lecture
	Brief overview of DNA replication (as relevant to this Genetics course-	11 (286-291)
	more details can be found in Chapter 12 but are not required)	12 (315-323)
	Karyotype. Replication/duplication of chromosomes.	
Week 3	Chromosomal sorting during Mitosis/Meiosis	2 (entire chapter)
	Gamete Formation/Chromosomal inheritance/	2 (entire chapter)
	Non-disjunction/Aneuploidy	9 (read entire chapter but focus on pages 237-255)
Week 4	**Exam 1 Monday, April 19**	
	Basic Principles of Heredity – 1	
	Dominant/Recessive alleles	3 (44-51)
	Complete dominance, Mendel, Monohybid crosses	
Week 5	Application of Probability and Binomial Expansion to Genetic Crosses	3 (51-56)
	Incomplete dominance	
	Basic Principles of Heredity – 2	3 (57-65)
	Dihybrid crosses, Branch diagrams, Chi-square test	
Week 6	Sex Determination/ Anomalies	4 (74-81)
	Sex-Linked Characteristics/	4 (81-84, 86-91)
	Sex influenced and sex limited characteristics	5 (114-117)
Week 7	Extensions and Modifications of Basic Principles -1	5 (99-105)
	Lethal alleles, Penetrance and Expressivity	
	Exam 2 Wednesday, May 12	
	Allelic Series, Codominance, Blood groups	
Week 8	Extensions and Modifications of Basic Principles -2	5 (106-110, 117-120)
	Gene Interactions, Cytoplasmic Inheritance,	
	Maternal Effect	
	Genomic Imprinting	5 (120-121)
Week 9	Pedigree Analysis/ Genetic Testing	6 (135-142, 147-151)
	Linkage, Recombination and Eukaryotic Gene Mapping-1	7 (entire chapter)

Week 10 **<u>Holiday May 31</u>**

Linkage, Recombination and Eukaryotic Gene Mapping-2 7 (entire chapter)

<u>Exam 3 Friday, June 4</u>

Week 11 **Final Quiz (8:00 – 11:00 AM)**
(**Monday, June 7**)
