BICD100

Genetics

Fall 2014
MWF 4:00-4:50pm Peterson 108/110

Instructor: Laurie Smith
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Instructor Office Hours: Mondays and Wednesdays ~5:10- 6:00pm in Muir Bio Rm. 1208

Website: http://ted.ucsd.edu (click on BICD100 FA14)

Course Description

An introduction to the principles of heredity emphasizing diploid organisms.

Broad Learning Goals

Students will:

Understand the nature of genetic variation and how it contributes to phenotypic variation

Develop skills in the interpretation and analysis of data from genetic experiments

Learn about ways that genetics is used as tool to study biological processes and solve "real world" problems

Grading

Grades will be determined based on the total number of points earned through the evaluations described in the right column:

≥450 points (90%) A (A+, A or A-)
≥400 points (80%) B (B+, B or B-)
≥300 points (60%) C (C+, C or C-)
≥250 points D

If necessary, these cutoffs will be adjusted downward so that at least 50% of students receive an A or a B, but they will not be adjusted upward for any reason. See page 4 for important information about exam and quiz policies.

Assessments

Midterm (160 points): November 10, 8-9:30 pm

Several locations – students will be assigned to locations just before the exam date. Covers material through November 5.

Final (220 points): December 16, 3-6 pm

Cumulative but emphasizing material new since the midterm. Locations TBA.

Quizzes/Section Participation (70 points)

Quizzes will be given almost every week in discussion section starting week 2 (Oct. 15-17), each worth 10 points and consisting of a problem from the problem set posted the week before on TED. You can only receive credit for taking a quiz in the section you are enrolled in as shown at http://sections.ucsd.edu. It is your responsibility to know what section you are enrolled in so please confirm! An additional 20 points will be available (awarded by your TA) for consistent attendance and high quality participation in discussion sections. See more info under Discussion Sections heading, pg. 3.

Clicker Questions (50 points)

Questions will be asked in class that you will respond to using an i>Clicker. Each question is worth 1 point (half for answering at all, another half for answering correctly). Answers will start counting for credit in week 2 (Oct. 13). A cumulative total of your clicker points for the quarter will be posted at the end of each week on TED. Once you reach the maximum possible 50 points, your clicker point total will not go any higher. See Clickers section pg. 3 for more info.

Class Schedule	Assigned Reading (chs. & pgs. in Klug et al. 8th ed,) Note: chapter intros also recommended for all partial chapter reading assignments
10/3 Course intro	
10/6 Mendel I: principle of segregation	Ch. 3: 3.1-3.8
10/8 Mendel II: independent assortment	"
10/10 Meiosis, non-disjunction, X-linkage, sex determ	Ch. 4: 4.11, Ch.5: 5.3; Ch. 6: 6.1-6.2
10/13 Pedigree analysis	Ch. 3: 3.9; Ch. 4: "Mitochondrial Mutations" pg. 81
10/15 Extensions to Mendel I: incomplete penetrance, variable expressivity, complementation	Ch. 4: 4.9, 4.13 thru pg. 77
10/17 Extensions to Mendel II: gene interactions	Ch. 4: 4.8, 4.10
10/20 Gene and chromosome structure	Ch. 9: 9.6; Ch. 11: 11.4; Ch. 15: 15.6-15.10
10/22 Mutations I: DNA damage and repair	Ch. 14: 14.1 -14.5; Ch. 6: 6.4 - 6.6 thru pg. 117,
10/24 Mutations II: functional classification	6.7 thru pg. 119, 6.8; Ch. 4: 4.1, 4.3 - 4.5
10/27 Genes and cancer	Ch. 16: 16.1, 16.2 16.4, 16.6; pg. 335
10/29 Epigenetics (Prof. Julie Law, Salk Institute)	Ch. 4: 4.14; "DNA methylation" pg. 308-309; special topics section on epigenetics pg. 493-501
10/31 Gene mapping I: recombination and linkage	Ch. 7 thru pg. 135
11/03 Gene mapping II: DNA markers, LOD scores	Ch. 7: 7.5; Ch. 19: section on ASOs pg. 403-404
11/05 The human genome	Ch. 17: 17.1; Ch. 18: 18.1, 18.4, 18.5; pg. 415
11/07 Population genetics I: Hardy-Weinberg, application to DNA fingerprinting	Ch. 22: 22.1 – 22.3; "DNA Forensics" pg. 502-511
11/10 Population genetics II: genetic drift, gene flow	Ch. 22: 22.4 - 22.7
11/12 Population genetics III: mutation, selection	"
11/14 Population genetics IV: inbreeding	Ch. 22: 22.8; "Purebred Dogs" pg. 82-83
11/17 Quantitative traits, measuring heritability	Ch. 21: 21.2 – 21.4
11/19 Quantitive Trait Loci (QTL) mapping, marker-assisted selection	Ch. 21: 21.5; pg. 450
11/21 Complex traits, GWAS, personal genomics	Ch. 19: 19.6
11/24 Genes & behavior (Prof. Ralph Greenspan, Kavli Institute for Brain and Mind, UCSD)	
11/26 No class due to upcoming…	(No assigned reading this week!!)
11/28 THANKSGIVING HOLIDAY	
12/01 Gene therapy, genetic engineering	Ch. 19: 19.1 – 19.3; 19.7, 19.8
12/03 Reverse genetics I: gene knockouts, RNAi	Ch. 15: 15.12; pg. 250
12/05 Reverse genetics II: Genome editing	None
12/8 Bacterial genetics and genomics	Ch. 8 thru first half of pg. 157; 8.4-8.5
12/10 The end: telomeres, aging and cancer* (Prof. Vicki Lundblad, Salk Institute)	Ch. 10: 10.7; section on telomeric DNA sequences pg. 227; Telomere box pg. 213
12/12 Final exam practice (not a review session)	None

Note: Midterm Nov. 10 8:00-9:30pm
Final Dec. 16 3:00-6:00pm

READINGS

Assigned readings for this class are from Klug et al. Essentials of Genetics, 8th edition. It is available new or used at the UCSD Bookstore and many other sources. There is no difference between the version available at the Bookstore vs. elsewhere – as long as you get the 8th edition you have the right book. We are not using Mastering Genetics (online homework module associated with this book) so you do not need to purchase an access code for that or purchase a new book to get this access code.

Another resource for this class is the Study Guide that goes with the textbook (for sale at UCSD Bookstore). This has detailed answers to all chapter end problems. Homework for this class is posted weekly on TED and consists of problem sets and keys created by the instructor. Chapter end problems in the textbook can be useful additional practice but not all are relevant and most are not representative of the questions you will see on the exam. The Study Guide will be useful for those doing these chapter end problems, but it is not necessary for success in this class.

CLICKERS

You will need an i>clicker for this class – other clicker brands will not work, but any i>clicker model will work. You can buy a new or used one at the UCSD Bookstore or another source. Regardless of where you got it, you will need to register your i>clicker on TED to get credit for your responses: after you login and select this class, in the blue menu block on the left click on "i>clicker Registration". On the next page, enter the serial no. from the back of your clicker (see illustration to help you find this number). If the serial number is illegible, bring your clicker to the instructor for help. You only need to register the clicker once on TED - if you have done this before for another class at UCSD you are done. DO NOT register your clicker at iclicker.com – this will not get you into the TED database for UCSD classes!! Do not switch clickers mid-quarter unless it's absolutely necessary but if you must switch, notify the instructor because your two clicker response records will need to be manually stitched together. Allowances will not be made for forgotten or malfunctioning clickers (e.g. dead batteries), absence from class regardless of the reason, or adding the class late. There will be enough "extra" clicker questions to give everyone a fair shot at earning the maximum of 50 clicker points in spite of these kinds of issues.

DISCUSSION SECTIONS

Weekly discussion sections are designed to help you develop the skills in problem solving and data analysis that will be important on the exams, and give you the opportunity to build relationships with fellow students and your TA. You can view the discussion section schedule any time at http://sections.ucsd.edu. Beginning at 6:00 PM on Sun. Oct. 5th, you can enroll in a section at this site (note that until section enrollment opens you will see a message saying "Enrollment has been closed" when in fact it just hasn't opened yet). Login using your UCSD student PID and select this class. After logging in, if you are enrolled in the class, you can then enroll in any of the sections that still have space available by clicking the "enroll" button for that section. The section you are enrolled in will then be highlighted in green. If you are not yet enrolled in the class, you will only be able to indicate your preferences; it/when you are enrolled in the class later, you will then be enrolled in your top ranked choice among those that still have openings (but be aware it takes a day or two from the time you add the class when you have access to section enrollment). Until 6:00 PM on Tues. Oct. 14th, you can change your section enrollment if necessary by logging in and clicking on the "enroll" button for a different section. After this enrollment changes will only be allowed in exceptional circumstances and you will need to contact Professor Smith to request such a change.

Sections will meet for the first time in week 1 (Oct. 8-10). Beginning in week 2 (Oct. 15-17), a 10 point quiz will be given almost every week thereafter (no quiz the week of the midterm or Thanksgiving week). There will be a total of 7 quizzes. Each quiz will consist of one problem from the homework set posted on TED the week before. Bring your own paper to write out and hand in your answer to this question. Every student can drop their lowest two quiz scores, including zeros resulting from missing section for any reason. Requests to reduce the impact of missing more than two quizzes will only be considered in cases where a student has a problem so serious as to result in missing 3 or more discussion sections for reasons beyond the student's control, and will require documentation of such a reason for all of the absences. Contact Prof. Smith if you are in this situation. Credit will only be given for quizzes taken in the section you are enrolled in as shown at sections.ucsd.edu.

MORE EXAM AND QUIZ INFO AND POLICIES

Students with accommodations for exams from the Office of Students With Disabilities must provide their accommodation letter to Dr. Smith at the beginning of the quarter or as soon thereafter as the letter becomes available. Please contact Dr. Smith about a week before each exam to arrange for your accommodation. Please speak with your TA regarding how your accommodation will be applied to quizzes.

After the grading of each exam is completed, you can view your score at the course website (go to Tools in the course menu, and click on "My Grades"). A weekly update of cumulative clicker points for the quarter will also posted here at the end of every week. After the quarter ends, your discussion section points (quiz + participation points) and final grade will also be posted here.

If you find an error in the grading of your exam, you can request a regrade by submitting your exam to Dr. Smith in class with a note attached explaining the grading error within one week of when graded exams were first made available for pickup; no requests will be considered after this date, except for correction of point addition errors. Similarly, if you believe there was an error in the grading of one of your quizzes, you must raise this concern with your TA within one week of getting the quiz back.

If you have an illness, injury or personal crisis that you believe will prevent you from performing adequately on an exam, contact the instructor about this problem before the exam to discuss your options. If you cannot do this and miss an exam for one of these reasons, contact the instructor as soon as possible. Once you have taken an exam (or part of it), you will not be able to drop the score or negotiate a reduction in its impact on your grade for any reason, so it is imperative that you decide you are well enough to take an exam before it starts. See Discussion Sections for discussion of the impact of missed quiz scores due to absence from Section.

ACADEMIC DISHONESTY

Academic dishonest (aka cheating) will not be tolerated in this class. According to UCSD 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 or quiz
- allowing another student to copy your work
- altering graded assignments and submitting them for a regrade[+]
- responding to clicker questions in class using another student's clicker*

* If a TA sees a student using more than one clicker, both clickers will be confiscated immediately for the remainder of the class period.

[+]Altering an exam and submitting it for a regrade is an incredibly bad idea since some exams will be photocopied prior to returning them to students, and any exam handed in for a regrade will be checked against the original.

Any student caught or suspected of violating the principles of academic integrity at UCSD by doing one of the things on the list above will be reported to the UCSD Academic Integrity Coordinator and the Dean of the student's college. Confirmed cases of cheating will result in a reduction in the student's grade – violations determined by the instructor as particularly serious (e.g. cheating on an exam or repeated instances of cheating) will result in the student receiving an F as their final grade as well as other disciplinary actions determined appropriate by the Academic Integrity Coordinator.