

IB S141 - HUMAN GENETICS

MTWTh 10:00 am-11:30 noon

2040 VLSB

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Office Hours – M, Th 11:30 am –12:30, or TBA
3007 VLSB

Text: *Human Genetics: Concepts and Applications (10 e)*, by Ricki Lewis ISBN-13: 978-0073525273

Also recommended for deeper understanding: *Human Evolutionary Genetics* by Jobling, MA et al, ISBN: 0815341857

And *Human Genetics (Genetics & Evolution series)* by R. Hodge ISBN: 9780816066827

Evaluation:	Quizzes	10%	unannounced (in class)
	Midterms	40%	July 9 (Dwinelle 155) & July 28 (Dwinelle 155)
	Finals	50%	August 13, 2015 (Li Ka Shing 245)

Testing will be based on class activities and lecture material, some of which is not in the book.

TENTATIVE SEQUENCE OF TOPICS

Readings in Lewis (chapter or pages; hyphen = “through”)

June 22	Introduction; Mendelian inheritance	1, 4.1 - 4.4, syllabus
June 23	Punnett's, probability, predictions, . . .	4, p. 91-92, probability worksheet
June 24	Pedigrees	4.4, pedigree worksheet
June 25	Chromosomes	13-13.2
June 29	Cell division and gametogenesis	2.3, 3.2 – 3.3
June 30	Nondisjunction & other chromosomal abnormalities	13.3 –13.5
July 1	Sex chromosomes and sex-linked traits	6.1 – 6.3
July 2	Development: patterns and embryonic features	p. 53 - 57
July 6	Sexual Development Errors / Evolution	3.5
July 7	Epigenetics and Evolutionary Development	11
July 8	Variation in Gene Expression	5 - 5.3, 6.4 - 6.5
July 9	MIDTERM I (covers material through 7/7)	Meet in Dwinelle 155
July 13	Recombination, gene linkage and mapping	5.4
July 14	Nucleic acids: gene structure and function	9
July 15	The Central Dogma (and “violations” thereof)	10
July 16	Mutations, DNA Repair and Human Evolution	12
July 20	Inborn errors of metabolism	p. 21, 193-194 (PKU)
July 21	Genetics of blood groups	p. 92-93, 346-347
July 22	Genetics of Immunology	17
July 23	Molecular techniques and applications	19, 14.4
July 27	More molecular techniques	22
July 28	MIDTERM II (covers through 7/22)	Meet in Dwinelle 155
July 29	Genetics of cancer	18
July 30	Multifactorial traits, heritability and twinning	7, 8.4 - 8.7, p. 57 - 59
August 3	Population Genetics	14 – 14.3, 15 – 15.2
August 4	Inbreeding and Selection	15.3 – 15.7
August 5	Human Evolution	16
August 6	Reproductive technologies	21
August 10	Prenatal diagnosis and genetic counseling	20 – 20.2, 13.2

August 11 Gene therapy and treatment of genetic disease
August 12 Wrapping it all up
August 13 **IN-CLASS FINAL EXAM**

20.3

Meet in Li Ka Shing 245

Note: If you require special test conditions, obtain a letter from Student Services and give to the instructor before **July 2** to insure that we can accommodate you. If you must miss an exam due to dire emergency, arrange it with the instructor **BEFORE** the exam. **Quizzes occur randomly, and missed quizzes cannot be made up.** It is in your best interest to attend all class meetings. Please be helpful to one another, and do not steal answer keys from the board outside 3007. **I don't grade on the curve.**

COURSE OBJECTIVES

- By the end of the 8-week session, each student will be able to . . .
- . . . *solve* a variety of problems.
 - . . . *think* more analytically.
 - . . . *construct* and *analyze* pedigrees.
 - . . . *predict* results of genetic crosses, determine genotypes and phenotypes of P and F generations, and *explain* unexpected outcomes.
 - . . . *discuss* genetic aspects of human evolution, as well as causes and consequences of gene mutation.
 - . . . *design* investigations using molecular techniques and *analyze* data from such experiments.
 - . . . answer questions like . . .
 - a. Why is calico coat color not usually found in male cats?
 - b. How can an XY male grow up female?
 - c. How did humans evolve to be what they are today?
 - d. What the heck is a "zinc finger"?
 - . . . and lots of other interesting stuff.

EXPECTATIONS OF STUDENTS

1. Keep up with the reading. The course is fast paced, and it's a good idea to not get behind.
2. Come to class prepared to think and participate **every** day.
3. Study a little bit every night and keep current. **There will be several unannounced quizzes.**
4. Work collaboratively with at least one other student in class; help each other learn.
5. Do your own thinking on all quizzes and exams.

READING

1. Become familiar with the text, including case studies, appendices, index, etc.; refer to lecture notes often.
2. Create and do problem sets for practice. Do not memorize lists. Repeat: Do **NOT** memorize lists.
3. Read deeply and critically, thinking about the material. Report the text's typographical errors to us.

TESTING

I'm less interested in how well you memorize random bits of information than in how well you can apply what you know to solving problems. When I write a name and date during lecture, it's just to give you context and background. Don't memorize dates, names of people, tables or definitions word-for-word. Practice figuring things out.

STATISTICS

Bring a calculator that can do at least 5th-grade math (+, -, ÷, x). Some students complain about the math the first two weeks. It's necessary for understanding genetics, but it's only a small part of the term.

GRADING

I DO NOT GRADE ON THE CURVE!! I use a traditional fixed scale:

A	90 – 100%
B	80 – 89%
C	70 – 79%
D	60 – 69%
F	0 – 59%

Help each other understand genetics. If you work together and work hard, everyone could get an A.
Research shows that social learning is much more powerful than studying alone.

I assume you have all had general biology and know how a cell works. Nevertheless, we will have some review during the course to catch everyone up to Bio 1 understanding and promote a common base.