



BIO 340: GENETICS
SPRING 2023
 Department of Biology @ CSU Dominguez Hills

Class time and location: MW 10a – 11:15a
 SBS B209
 Instructor: Dr. Sonal Singhal
 Office hours: MW 11:15a – 12:30p
 Office: [REDACTED]
 Phone: [REDACTED]
 E-mail: [REDACTED]

Course Description

Have you ever wondered why children look like their biological parents? Or, what it means if your genetics puts you at risk for heart disease? Or, whether or not you should spend \$100 to sequence your own genome? Or, why people get cancer? Or, where mutations come from and how they affect individuals and species? Or, if scientists should be allowed to edit the genomes of other humans or other species? These are all questions relevant to the study of genetics, and all questions that you will be able to answer at the end of this class.

This is a flipped class. You will review lecture notes & watch videos at home on your own. When we meet during class, you will learn concepts by working individually and in teams to analyze data and solve problems. Why do I teach this class this way? I have found that this approach helps you learn the material better, have more fun, and develop important skills like teamwork and communication.

From the course catalog: Principles of heredity, gene expression at the molecular and organismic levels, variation and mutation. 3 units.

Prerequisites: Bio 124, Bio 125, Mat 131 (Statistics), and Bio 220 (Molecular Biology)

Recommended: Che 310/311 or Che 316/317

Student Learning Objectives

After finishing this class, you should be able to:

- Explain how cells in our body can look different even if they have the same genome
- Understand how mutations affect genotypes and how genotypes affect phenotypes
- Understand why parents and offspring sometimes (but not always!) look similar
- Explain the genetic basis of cancer
- Understand how genes evolve through time
- Discuss the social and ethical issues of genetics
- Solve genetic problems by using multiple concepts and logic
- Share your ideas with each other & with me in writing and out loud

Materials

Required Material: None!

Schedule

Non-exam weeks in this class are set-up the same way because it helps me & you stay organized.

BEFORE MON Read Handout (posted on Canvas)	BEFORE MON Watch Videos (posted on Canvas)	MONDAY Attend Lecture 10a - 11:15a	MONDAY Quiz Due 11:59p on Canvas	WEDNESDAY Attend Lecture 10a - 11:15a	WEEKEND Review Problem Set Key posted on Canvas
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Blue boxes are activities we will do in class; pink boxes are activities happening on Canvas.

Recipe for Success

How can you be successful in this class?

- **Attend class.** I do not require attendance, but learning by yourself will be less fun & effective.
- **Follow my suggested schedule.** The material in this class builds on itself with each week. If you get behind, it can be hard to catch-up. I will be here to help you if you fall behind, but I recommend setting yourself for success by staying on schedule.
- **Ask questions and participate in class.** I know it can be scary to ask questions, but I can promise you that if you have a question, you are not the only one. We will also do a lot of group work so that you can also ask questions & participate in a smaller (hopefully less intimidating) environment. This also means being engaged in class, so be careful how you use your phone.
- **Work to understand rather than memorize.** This class will require you to apply what you know to real examples. If you memorize the material, it will be hard to apply it. We will practice making sure we understand the material through our problem sets.
- **Watch my videos.** I made these videos to cover the trickiest parts of genetics. Watch them on 1.5x or 2x speed if you like, but watch them! It might help provide a different perspective on the material than what you are getting in class.
- **Study a few times a week for this class.** To be honest, I set up the class to force you to constantly be studying for this class. We cannot learn effectively when we force ourselves to learn two weeks of material in one night. In this class, you will always have a quiz or problem set to tackle.
- **Use the problem set keys to evaluate how well you are doing.** I post the answers to the problem sets so that you can check your answers against the right answers. If you got an answer wrong, figure out why on your own, with your friends, or by chatting with me.
- **Make friends in class.** I put you in groups because Biology Toros are super awesome, super friendly, and super smart. When you work together, you learn more. I would recommend doing the problem sets with each other in-class AND out-of-class.
- **Come visit me in my office, SCI 210.** Chatting one-on-one can be easier than chatting in class. Plus, I love meeting you all and getting to know you better. ☺
- **Contact me when life gets complicated** and focusing on school becomes hard. You don't need to tell me what is going on, but you do need to tell me that you need extra support or time to finish up the class.
- **Take advantage of revisions.** Like most things in life, learning takes time and effort. (Think about it this way: most people cannot run a marathon after the first time they go to the gym.) I designed this class to give you multiple times to try to learn & re-learn the material. Be sure to take the time to do revisions, as necessary.
- **Have fun!** I am totally biased, but genetics is probably the coolest part of biology. This material is super interesting and relevant to our daily lives. I hope you will enjoy learning it!

Grading

An important idea in this class is that learning takes time. So, every aspect of this class is designed to give you multiple chances to show me what you learned and to improve on your work.

Problem Sets	0 points
Quizzes (9)	100 points
Exams (5)	500 points
Total:	600 points

Problem set: There is a problem set for each of the 10 modules. I wrote the problem set to cover the key ideas from that module & to have you practice doing questions that are similar to those on the exam. You will have time to do these in class. You should work on these in groups so that you can help each other, and you should plan to check your answers with my problem set key. I will not be grading the problem sets. This is a tool solely designed to help you study.

Quizzes: At the start of each module, I will release a quiz with 10 multiple-choice questions. This quiz is designed to motivate you to read through the module slides and to watch the online videos. The questions on the quizzes will be *much* easier than those on the problem sets & exams.

Redo Policy: You can do each quiz twice, but the questions will change between attempts. I will keep your highest score out of the two attempts.

Exams: You will have four semi-cumulative exams (100 points each) and one final individual exam (cumulative, 100 points) for the course. Each exam will be taken in class and will be designed to take you ~50 minutes. The exams will be very similar to the questions on the problem sets.

Redo Policy: You will be able to submit any one exam problem for re-grading for full points. I have set flexible deadlines on these revisions so that you can complete them when your schedule best permits. However, I would suggest doing them earlier than later when the material is still fresh. (We will discuss this policy in more detail in class.) On the final exam, if you do better on your final exam than any of your in-class exams, I will replace your lowest in-class exam grade with your final exam grade. I do this because the class is cumulative. If you don't understand it the first time, you will see it again and again ...

Extra Credit: Synthesis activities: You will have four synthesis activities that will be more challenging and / or open-ended than the questions you see on exams. Synthesis activities will be graded on a 0 to 4 scale (rubrics included). A 0, 1 or 2 will give you no extra credit points. Each 3 on your synthesis activity will increase your final grade by 0.5%; each 4 on your synthesis activity will increase your final grade by 1%.

Redo Policy: You will be able to revise & resubmit each synthesis activity twice. I have set flexible deadlines on these activities so that you can complete them when your schedule best permits. However, if you wait too long, you will not have time to do revisions.

Extra credit: No extra credit is offered in this class.

Grades will be assigned on a standard scale:

94 - 100: A	80 - 82: B-	67 - 69: D+
90 - 93: A-	77 - 79: C+	60 - 66: D
87 - 89: B+	73 - 76: C	0 - 59: F
83 - 86: B	70 - 72:	

Tentative Schedule		
Date	Topic	Assessment due
Mon., Jan. 23	Class Introduction	
Wed., Jan. 25	How to succeed in this class	
Mon., Jan. 30	Module 1: Genomes, Chromosomes, and Genes	Quiz 1 @ 11:59p
Wed., Feb. 1	Module 1: Genomes, Chromosomes, and Genes	
Mon., Feb. 6	Module 2: Genes to Proteins & Mutations	Quiz 2 @ 11:59p
Wed., Feb. 8	Module 2: Genes to Proteins & Mutations	
Mon., Feb. 13	Module 2: Genes to Proteins & Mutations	
Wed., Feb. 15	Module 2: Genes to Proteins & Mutations	
Mon., Feb. 20	President's Day – NO CLASS	
Wed., Feb. 22	In-class Exam 1 on Modules 1 & 2	
Mon., Feb. 27	Module 3: Genotype to Phenotype	Quiz 3 @ 11:59p
Wed., Mar. 1	Module 3: Genotype to Phenotype	
Mon., Mar. 6	Module 4: Inheritance 1	Quiz 4 @ 11:59p
Wed., Mar. 8	Module 4: Inheritance 1	
Mon., Mar. 13	In-class Exam 2 on Modules 3 & 4	Exam 1 Revision
Wed., Mar. 15	Module 5: Inheritance 2	Quiz 5 @ 11:59p
Mon., Mar. 20	Module 5: Inheritance 2	
Wed., Mar. 22	Module 6: Inheritance 3	
Mon., Mar. 27	SPRING BREAK	
Wed., Mar. 29	SPRING BREAK	
Mon., Apr. 3	Module 6: Inheritance 3	Quiz 6 @ 10a
Wed., Apr. 5	Module 6: Inheritance 3	
Mon., Apr. 10	In-class Exam 3 on Modules 5 & 6	Exam 2 Revision
Wed., Apr. 12	Module 7: Complex traits	
Mon., Apr. 17	Module 7: Complex traits	Quiz 7 @ 10a
Wed., Apr. 19	Module 8: Cancer genetics & epigenetics	
Mon., Apr. 24	Module 8: Cancer genetics & epigenetics	Quiz 8 @ 10a
Wed., Apr. 26	Module 8: Cancer genetics & epigenetics	
Mon., May. 1	In-class Exam 4 on Modules 7 & 8	Exam 3 Revision
Wed., May. 3	Module 9: Evolutionary genetics & personal genomics	
Mon., May. 8	Module 9: Evolutionary genetics & personal genomics	Quiz 9 @ 10a
Wed., May. 10	Module 9: Evolutionary genetics & personal genomics	
Mon., May 15	Cumulative in-class final exam (10a - 12p)	All activities (incl. #4!) and revisions due

University Policies

Academic Integrity: This course will be conducted in accordance with the University Policy on Academic Integrity (p.14 University Catalog). Any student caught cheating or plagiarizing will receive an F (0 points) on the assignment and will be penalized according to University regulations. Cheating or plagiarism is subject to discipline as provided in Title 5, California Code of Regulations. Plagiarism is a very serious offense. See the University Catalog under Academic Integrity for further information.

Exams: no cellphone use of any kind is allowed during exams. Cellphones will be turned off and secured in your bookbag, which will be placed on the floor for the duration of the exam.

Plagiarism: it is imperative that you cite all your sources on assignments. Academic misconduct of any kind, including cheating on exams and plagiarism, will result in a grade of F for the course, and possibly other sanctions. Once you have completed this course, do not share assignments etc. with students in subsequent semesters. If anyone turns in your assignment in a future semester, you will be held accountable and face sanctions.

Disruptive Students: Behavior that persistently or grossly interferes with classroom activities is considered disruptive behavior and may be subject to disciplinary action. Such behavior inhibits other students' ability to learn and an instructor's ability to teach. The instructor may require a student responsible for disruptive behavior to leave class pending discussion and resolution of the problem and may report a disruptive student to the Student Affairs Office (WH A-410, 310-243-3784) for disciplinary action.

CSUDH adheres to the Americans with Disabilities Act with respect to providing reasonable accommodations for students with temporary and permanent disabilities. To receive accommodations, students with disabilities must register with Students disAbility Resource Center. For more information, please contact their office in Welch Hall D-180 at (310) 243-3660 (voice) or (310) 243-2028 (TDD).

Computer/Information Literacy Expectations for Students enrolled in this class: Students in this class are expected to:

- Use assigned Toromail account or other university approved email.
- Have ability to navigate and use Blackboard.
- Have basic information and computer literacy in one of the computer formats (Windows, Macintosh, or GNU/Linux).
- Upload files in all of the computer formats (.doc, .docx, .jpeg, .ppt, .pdg, .xps).
- Access and choose appropriate library and other scholarly sources of information.
- Search for and find relevant scholarly information effectively.
- Be able to paraphrase concepts without plagiarizing.
- Maintain the minimum computer Hardware requirements*
- Maintain the minimum computer Software requirements*

*Please visit <http://www.csudh.edu/academic-technology/instructional-technologyresources/online-courses-tech/> for the most up-to-date Hardware & Software computer requirements