

Biology 28S: Molecular Genetics and Biotechnology*Summer 2019*

Tuesdays and Thursdays, 1:30 – 2:50 PM

STLC 115

- Instructor:** Dr. Jeremy Hsu
jlhsu@stanford.edu
Office: TBD
- Teaching assistant:** TBD
Sections: TBD
- Office hours:** *Office hours for JH:*
TBD
Or by appointment – just email!
- Office hours for TA:*
TBD

I. Course objectives, units, and prerequisites

This course covers the fundamentals of molecular genetics, including principles of how genes work, how gene expression is regulated in both prokaryotes and eukaryotes, and how signals are passed from cells to cells that are far away. We will also explore key advances in biotechnology, including cloning, sequencing, and next-generation sequencing, and discuss case studies involving cancer, Huntington's Disease, and more.

Prerequisites: High school biology; AP or IB Biology recommended

II. Course learning outcomes

1. Students will apply key concepts in molecular genetics, particularly on the molecular biology of DNA, RNA, and proteins, to interpret various experimental scenarios and outcomes
2. Students will evaluate how various molecular and computational techniques allow for greater insight of different diseases
3. Students will examine and interpret key experiments in molecular biology

III. Required textbook

Freeman, Scott. *Biological Science*, volume 1. Fifth edition. Pearson Benjamin Cummings, San Francisco, 2013. ISBN: 978-0-321-84180-3.

IV. Course requirements and expectations

1. Attendance at all lectures is **required**. This class will rely heavily on active learning strategies, so you must come to class on-time, prepared, and ready to engage with the instructor and your peers. Lack of attendance and participation may detrimentally impact your grade.

2. You are expected to read the relevant portions of the textbook, as listed in the syllabus and problem sets.
3. There will be one midterm exam, two quizzes, and a cumulative final. Makeup exams will only be offered for legitimate reasons (e.g. a Stanford-sanctioned athletic or academic competition) and must be pre-approved by the instructor prior to the test.
4. Homework is due at the beginning of class on the dates listed; late homework turned in on the same day as the due date will receive a maximum of 50%.
5. All regrade requests must be made in writing within seven days after the quiz or exam was handed back. You must provide a paragraph describing why you feel you were incorrectly penalized on the question, referencing the proper answer and other sources, as appropriate. Please note that submitting a regrade request means that the entire exam will be subject to regrading, **which may occasionally lead to a net loss of points**. All instructor's decisions on regrade requests are final. Please also note that exams are photocopied at random before being handed back, and that evidence of altering your written answers on the quiz or exam is a violation of Stanford's academic integrity standards. Simple errors in grading (e.g. incorrect addition of total points) may be corrected immediately at the discretion of the instructor.

V. Grading procedure

Point breakdown for Biology 28S

Quiz 1	50 points	5%
Quiz 2	50 points	5%
Midterm	300 points	30%
Five problem sets in sum	100 points	10%
Participation	100 points	10%
Final exam	400 points	40%

Accumulation of lecture and lab combined points totaling 970+ = A+; 925-969= A; 895-924= A-; 870-894= B+; 825-869= B; 795-824=B-; 770-794=C+; 725-769=C; 695-724=C-; 670-694- D+; 625-669=D; 595-624=D-; 594 and below= F.

VI. Class management system

Important announcements and resources will be posted on Canvas. Please make sure you are enrolled and can view this class at canvas.stanford.edu.

VII. Honor code

The Stanford Honor Code states that students “will not give or receive aid in examinations; will not give or receive unpermitted aid in class work, in the preparation of reports, or in any other work that is to be used by the instructor as the basis of grading; [and] will do their share and take an active part in seeing to it that others as well as themselves uphold the spirit and letter of the Honor Code.”

VIII. Students with Documented Disabilities

Students who may need an academic accommodation based on the impact of a disability must initiate the request with the Office of Accessible Education (OAE). Professional staff will evaluate the request with required documentation, recommend reasonable accommodations, and prepare an Accommodation Letter for faculty dated in the current quarter in which the request is being made. Students should contact the OAE as soon as possible since timely notice is needed to coordinate accommodations. The OAE is located at 563 Salvatierra Walk (phone: 723-1066, URL: <http://studentaffairs.stanford.edu/oea>).

IX. Tentative course schedule and outline

N.b. Tentative problem set due dates are provided week-by-week for your benefit. Specific due dates will be announced in class; you will have at least one week to complete each problem set.

Week and topic	Chapter	Problem set	Quizzes, exams, and other notes
Week 1: 6/24 – 6/28 How genes work	16		
Week 2: 7/1 – 7/5 How genes work	16	Problem set #1 due	
Week 3: 7/8 – 7/12 Control of gene expression in prokaryotes	18	Problem set #2 due	Quiz #1 on 7/11
Week 4: 7/15 – 7/19 Control of gene expression in prokaryotes	18	Problem set #3 due	
Week 5: 7/22 – 7/26 Control of gene expression in eukaryotes	19		Midterm on 7/25
Week 6: 7/29 – 8/2 Control of gene expression in eukaryotes	19	Problem set #4 due	
Week 7: 8/5 – 8/9 Molecular techniques and biotechnology	20 / 21	Problem set #5 due	Quiz #2 on 8/8
Week 8: 8/12 - 8/16 Molecular techniques and biotechnology	20 / 21		Final exam on last day of class