LECTURES & GUEST SPEAKER DISCUSSIONS:  Tuesday & Thursday 3:30-6:00 → La Kretz 120

DISCUSSION SECTIONS:  Wednesdays → La Kretz 100: 1:00-3:00, 3:00-5:00 & 5:00-7:00

*The Double Helix* (J. D. Watson)
*Scientific American & Other Articles* (Downloaded from the Blackboard HC70A website or the Goldberg HC70A website using Adobe Reader 6.0 or later)

OFFICE HOURS:  Monday: 12:00-1:00 PM → Terasaki Life Sciences 4121
Phone: 310-825-9093; Email: bobg@ucla.edu

GOLDBERG HC70A WEBSITE:  http://www.mcdb.ucla.edu/Research/Goldberg/HC70A_W11/

HC70A BLACKBOARD WEBSITE:  http://www.lsic.ucla.edu/classes/winter11/


ADMINISTRATIVE ASSISTANTS:  Jennifer Kwan (kwanj@ucla.edu)
4125 Terasaki Life Sciences; 310-825-3270

TEACHING FELLOWS:
1-3 – Elaine Chiu (elainec90@ucla.edu)  Office Hours: Monday 8:30-10:30 AM → LS 2805
3-5 – Lulu Pantin (lulu1091@ucla.edu)  Office Hours: Tuesday 12:30-2:30 PM → LS 2805
5-7 – Eden Maloney (emaloney@ucla.edu)  Office Hours: Monday 3-5 PM → LS 2805

LECTURES:  Lectures will be webcasted and audio podcasted.  They can be viewed from the UCLA BruinCast site using RealPlayer.

GUEST LECTURES:  Guest speakers have been invited to highlight the real-life impacts of genetic engineering and new scientific breakthroughs on society.  **Note:** Attendance is required.

DISCUSSION SECTION:  Discussion Section will be taught as an Undergraduate Seminar in Socratic style and will focus on scientific articles and debates that relate to the history of genetic engineering and its current applications.  Articles will introduce important concepts and teach you how to read and think about science.  **Focus your reading around four questions:**  (1) What is the question being addressed by the article?  (2) What are the technologies/approaches being discussed?  (3) What is the significance of the technology and how does it apply to real-life situations?  (4) What ethical issues arise, if any, as a consequence of the new technology?  **Note:** You must read the articles and text background material before discussion section and come prepared to participate in a thoughtful and interactive manner.

QUIZZES:  A Take-Home Quiz will be handed out after class each Thursday, and will also be posted on the class website.  The take-home quiz focuses on the articles/topics/concepts covered in each Discussion.  Quizzes will count 25,000 points each.  **Note:** You may work together in groups in order to solve the quiz problems.  However, each of you must learn how to solve the quiz problem and hand in your own quiz.  A Discussion participation grade of up to 50,000 points will be assigned at the end of the quarter.

Quizzes are due at the beginning of the next Discussion Section.
CLASS RECEPTIONS & DINNERS: There will be a catered all-class reception for each guest speaker immediately following their Thursday lecture. This will give you an opportunity to interact with the speakers who are experts in their chosen fields. In addition, I will take groups of students to dinner throughout the quarter following the reception. The dinners may include the guest speakers, and will be a unique experience! Check the dinner group list that will be handed out in class for the week and day that you are scheduled to attend dinner.

DOUBLE HELIX REPORT: You will write a short report on *The Double Helix* by J. D. Watson that will count 50,000 points. Guidelines will be handed out in class.

The *Double Helix* Report is due at the beginning of class on Tuesday, January 18 (Week 3)

EXAMS: Exams include a Take-Home Exam and Two All-Class Oral Exams. Take-Home Exam questions will be handed out in class during Week 4 and will count 400,000 points. The mid-term oral exam will cover questions on the Take-Home Exam and will count 125,000 points. Final Oral Exam questions will be handed out in class during Week 9 and will count 175,000 points. The Exam Schedule is:

Take-Home Exam: Due Tuesday, February 8 at the beginning of class (Week 6)

All-Class Mid-Term Oral Exam: Tuesday, February 8, La Kretz 120 (Week 6)

All-Class Final Oral Exam: Thursday, March 10 La Kretz 120 (Week 10)

GRADING: You will be able to earn ONE MILLION regular points and a number of BONUS POINTS during the quarter. Your grade for this quarter will be based on 1,000,000 points, although you have the potential for earning more than 1,000,000 points. Regular points will be divided as follows:

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<tr>
<th>Total Points</th>
<th>% Grade</th>
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<tbody>
<tr>
<td>Double Helix Report</td>
<td>50,000</td>
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<td>Discussion Quizzes</td>
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<td>Discussion Participation</td>
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<td>Take-Home Exam</td>
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<td>Mid-Term Oral Exam</td>
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<td>Final Oral Exam</td>
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The following guidelines will be used to assign grades: A (>90%), B (80-89%), C (70-79%), D (60-69%), F (<60%). Your grade will be assigned using the following formula:

\[
\% \text{ Total Points} = \frac{|(\text{Regular points} + \text{Bonus points})|}{(1,000,000)} \times 100
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<tr>
<th>DATE</th>
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| 1/4  | Lecture 1: *The Age of DNA: What is Genetic Engineering?*  
Film: Craig Venter & Synthetic Organisms  
Demonstrations: Isolating DNA & Classical Genetic Engineering |
| 1/6  | Film: *Race for the Double Helix* |
| DISCUSSION 1: | *The Manipulation of Genes*  
Potential Biohazards of Recombinant DNA Molecules  
Recombinant DNA Debate |
| 1/11 | Lecture 2: *What Are Genes & How Do They Work: Part One*  
Demonstrations: Gel Electrophoresis & Bacteria “Cloning”  
DOUBLE HELIX REPORT QUESTIONS HANDED OUT  
BACTERIA “CLONING” GUIDELINES HANDED OUT |
| 1/13 | Speaker: Robert Wayne, PhD: *Hunting For Canine Ancestors & Engineering Modern-Day Dogs*  
All-Class Reception |
| DISCUSSION 2: | *Useful Proteins from Recombinant DNA*  
Discovering Genes for New Medicines |
| 1/18 | Lecture 3: *What Are Genes & How Do They Work: Part Two*  
Film: Kerry Mullis and PCR  
DOUBLE HELIX REPORT DUE  
Dinner 1 |
| 1/20 | Speaker: Richard Hamilton, PhD: *Engineering Plants For Biofuels*  
All-Class Reception |
| DISCUSSION 3: | *Transgenic Crops*  
Sowing a Gene Revolution  
Grassoline at the Pump |
| 1/25 | Lecture 4: *How Are Genes Cloned & Engineered: The Factor VIII Story*  
Demonstration: Making Your Own DNA Fingerprint! |
| 1/27 | Speaker: Channapatna Prakash, PhD: *Engineering Crops For the Developing World*  
TAKE-HOME EXAM QUESTIONS HANDED OUT  
All-Class Reception & Dinner 2 |
| DISCUSSION 4: | *Chromosome Mapping With DNA Markers*  
Keeping Your Genes Private |
| 2/1  | Lecture 5 – Professor John Harada: *How to Make Transgenic Organisms: From Mighty Mice to Golden Rice*  
Dinner 3 |
| 2/3  | Speaker: Harry Klann, Criminologist: *DNA Forensics & The Law*  
All Class Reception |
| DISCUSSION 5: | *When Science Takes the Witness Stand*  
DNA and Justice Denied  
Familial DNA Testing |
2/8
UC Davis Students Visit UCLA (2/8-2/10)
TAKE HOME EXAM DUE
ALL-CLASS MIDTERM ORAL EXAM
UCLA & UC Davis Class Reception & Dinner 4

2/10
Lecture 6: The Age of Genomics

DISCUSSION 6:
Transgenic Livestock As Drug Factories
Cloning For Medicine
The Land of Milk & Honey

2/16
Lecture 7: Identifying Individuals Past & Present Using DNA

2/17
Speaker: Pei Yun Lee, PhD: Stem Cells: Promise, Reality, and Conflict
All Class Reception & Dinner 5

DISCUSSION 7:
The Future of Stem Cells
The First Human Cloned Embryo
Pandora's Baby

2/22
Lecture 8: Human Genetic Engineering & Gene Therapy

2/24
Speaker: Michele Evans, MD: In Vitro Fertilization & Genetic Testing
Dinner 6

DISCUSSION 8:
Gene Therapy
Overcoming Obstacles to Gene Therapy
What Cloning Means for Gene Therapy

3/1
Lecture 9: Science & the Constitution: Regulating Science & GMOs
Dinner 7

3/3
Speaker: John Novembre, PhD: Tracking Human Ancestry
All-Class Reception

DISCUSSION 9:
Traces of a Distant Past
How We Are Evolving

3/8
Lecture 10: Science & the Constitution: Who Owns Your Genes?
Film: Knowledge or Certainty
Dinner 8

Discussion 10:
The Genetic Basis of Cancer
Mapping the Cancer Genome

3/10
FINAL ALL-CLASS ORAL EXAM
End of Class Reception
TEXT READING ASSIGNMENTS FOR LECTURES AND DISCUSSIONS: Note: These chapters review all information related to the topics covered in each lecture and discussion PLUS additional topics. Concentrate on chapter sections related to lectures and discussion articles.

INTRODUCTION TO BIOTECHNOLOGY, 2ND EDITION

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| LECTURES 10 & 11 | Chapters 12 & 13 |

| DISCUSSION TEN  | Chapter 11        |

DISCUSSION SECTION BIBLIOGRAPHY: Note: These articles are required reading for Discussion Section. They can be downloaded from the HC70A class websites (Goldberg or Blackboard) and opened using Acrobat Reader 6.0 or later.

DISCUSSION ONE – The Basics of Genetic Engineering

DISCUSSION TWO – Using Genetic Engineering to Make Drugs in Bacteria

DISCUSSION THREE – Using Genetic Engineering to Make Better Crops

DISCUSSION FOUR – Identifying and Testing Human Disease Genes

DISCUSSION FIVE – DNA Testing in the Courtroom
2. Sheldon Krimsky and Tania Simoncelli, DNA and Justice Denied. LA Times, December 22, 2010

DISCUSSION SIX – Genetic Engineering Farm Animals to Make Drugs

DISCUSSION SEVEN – Embryonic Stem Cells and Cloning for Medicine

DISCUSSION EIGHT – Gene Therapy: Fixing Human Genetic Defects

DISCUSSION NINE – Tracing Human Origins

DISCUSSION TEN – Understanding and Defeating Cancer