On February 28, 1953, Francis Crick strode into the Eagle, a pub in Cambridge, and announced to anyone who’d listen that he and his partner Jim Watson had just found the “secret of life.” Their discovery would mark the most famous moment in biology since Charles Darwin published the Origin of Species nearly a century earlier, Watson bragged to his sister a month later.

This bravado was not unjustified. Watson and Crick had worked out the elegant molecular structure of DNA. The double helix has become an icon of human power over life, and with good cause. In the past half century, a revolution in the scientific understanding has flowed directly from Watson and Crick’s discovery. It proved, Watson insists, that “life is simply a matter of chemistry”. Our power to manipulate that chemistry—to manipulate life itself—grows rapidly to ever more unprecedented levels. Today, genetic engineering, stem-cell research and cloning are no longer science fiction, but the stuff of newspaper headlines and heated partisan political debates.
These scientific and technological advancements have provoked persistent controversies about the fundamental nature and value of life. This class places these contentious and important debates in their larger economic, political and cultural context.

Course policy

I will provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities that may affect their ability to participate in course activities or to meet course requirements. Students with disabilities are encouraged to contact me early in the semester to discuss their individual needs.

If you have questions about any aspect of the course at any point in the semester, I strongly encourage you to talk to me, after class, in office hours, or during a scheduled appointment.

Books required


I will also post articles for discussion of current issues in biotechnology on the course homepage.

Weight of graded components

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Research paper</td>
<td>28%</td>
</tr>
<tr>
<td>Letter to member of Congress</td>
<td>9%</td>
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<tr>
<td>Discussion questions</td>
<td>5%</td>
</tr>
<tr>
<td>Book review</td>
<td>15%</td>
</tr>
<tr>
<td>Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Attendance</td>
<td>5%</td>
</tr>
<tr>
<td>Participation</td>
<td>7%</td>
</tr>
<tr>
<td>Biotech Agenda</td>
<td>11%</td>
</tr>
</tbody>
</table>

Writing assignments

You will write three papers. The first two papers will revolve around a topic important to current biotechnology policy: a twelve- to fourteen-page (3,000 to 4000 word) research paper and a letter to a member of the U.S. Congress (500 words maximum). They are worth 28% and 9% of the course grade respectively. The third paper, a five- to seven-page (1,250 to 1,750 word) book review based one or more of the three books assigned in this class, is worth 15%.
Lectures, interviews, discussion, attendance and participation

The first half of most class meetings will be devoted to either lecture or an interview with an outside speaker with expertise relevant to modern biology and biotechnology.

Attendance is obligatory, and counts 5% towards your course grade. You are allowed one unexcused absence during the semester. Your grade will be docked one percentage point for each of the next two unexcused absences and two percentage points for each one subsequently, with the possibility of accruing negative points. Classes missed due to sickness are excused only with a doctor’s note. Absence due to religious holiday, team commitment or other unavoidable circumstance will be excused only if you let me know in advance.

We will discuss the assigned books for fifty minutes on Tuesdays. You will submit at least four discussion questions to me via email no later than noon the Monday before the scheduled discussion. The discussion questions are worth cumulatively 5% of the course grade. On Thursdays for the first two thirds of the course we will discuss readings devoted to various important issues in modern biotechnology. The articles will be posted on the course homepage. Print them off and bring them with you to class. You are not required to produce discussion questions ahead of time for the Thursday assignments.

The structure of the class places particular importance on participation during discussion: it counts 7% towards your course grade.

Biotechnology Agenda

During the final five weeks of the course, we as a class will deliberate on the future of U.S. national biotechnology policy.

The exercises will focus on both policy and political skills. In the policy arena, we will develop criteria for framing and prioritizing policy problems, identify the standards for realistic solutions, and evaluate the necessary tradeoffs involved in any solution. In the political arena, we will address how to build a consensus, whether through persuasion or horse trading, in the face of differing priorities and conflicting interests.

Your participation in the Biotechnology Agenda discussions and assignments counts 11% towards your course grade.

Exam

There will be an exam, worth 20% of the course grade, during finals week (Tuesday, April 29th from 10:00 to 12:00 noon). Half of the exam will be devoted to short-answer identifications based on lectures. The other half will ask an essay question that will require you to synthesize material from lectures, reading, interviews and your research paper.
**Extra-credit assignments**

I will post an extra-credit assignment each Tuesday on the course website. You will have one week to complete it. I will add 0.5% to your final course grade for each of up to three successfully completed assignments.

**Academic misconduct and turnitin.com**

The penalty for academic dishonesty is course failure.

According to the Lyman Briggs Academic Honesty Policy, academic dishonesty includes (but is not limited to): cheating on assignments or examinations; fabricating data; plagiarizing, which means misrepresenting as your own work any part of work done by another; submitting the same paper, or substantially similar papers, to meet the requirements of more than one course without the approval and consent of all instructors concerned; depriving another student of necessary course materials or interfering with his or her work; and facilitating another in academic dishonesty. For more information, consult:

http://www.msu.edu/unit/lbs/academics/academic_honesty.html
http://www.msu.edu/unit/ombud/honestylinks.html

You will submit all written assignments to turnitin.com, a plagiarism-prevention service.

http://www.turnitin.com/

You need the following information to enroll:

Class ID: 2131152
Password: DoubleHelix

Discuss with me any questions about what does and does not constitute plagiarism, or if you have any technical difficulties with turnitin.com.

**Grade scale**

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**Course website**

Course announcements, lecture and presentation outlines, lecture slides, the weekly extra-credit assignment and copies of all handouts are available on the course website:

http://www.msu.edu/course/lbs/332/bellon/
<table>
<thead>
<tr>
<th>Date</th>
<th>Lecture, Interviews, Readings and Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 8</td>
<td>Reading: Public attitudes to biotechnology (distributed in class)</td>
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<tr>
<td>January 10</td>
<td>Introductions</td>
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<tr>
<td></td>
<td>Reading: see course homepage</td>
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<tr>
<td>January 15</td>
<td>Lecture: The Politics of Biotechnology</td>
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<tr>
<td></td>
<td>Reading: Charles, prologue thru chapter 5 (pp. xi-59)</td>
</tr>
<tr>
<td>January 17</td>
<td>Introduction to the Writing Assignments</td>
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<tr>
<td></td>
<td>Reading: see course homepage</td>
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<tr>
<td>January 22</td>
<td>Lecture: Machines for Turning Herbage into Money</td>
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<tr>
<td></td>
<td>Reading: Charles, chapter 6 thru chapter 11 (pp. 60-148)</td>
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<tr>
<td>January 24</td>
<td>Lecture: Beer and Biotechnology</td>
</tr>
<tr>
<td></td>
<td>Reading: see course homepage</td>
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<tr>
<td>January 29</td>
<td>Interview with John Waller</td>
</tr>
<tr>
<td></td>
<td>Reading: Charles, chapter 12 thru chapter 15 (pp. 149-235)</td>
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<tr>
<td>January 31</td>
<td>Lecture: Patents: the Promotion of Science and the Useful Arts</td>
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<tr>
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<td>Reading: see course homepage</td>
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<td>February 5</td>
<td>Lecture: Genetics: A Science of Heredity</td>
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<tr>
<td></td>
<td>Reading: Charles, chapter 7 thru chapter 11 (pp. 74-148)</td>
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<tr>
<td>February 7</td>
<td>Lecture: Eugenics Comes of Age in America</td>
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<tr>
<td></td>
<td>Reading: see course homepage</td>
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<tr>
<td>February 12</td>
<td>Lecture: Eugenics, Immigration and Sterilization</td>
</tr>
<tr>
<td></td>
<td>Reading: Hall, prologue thru chapter 3 (pp. 1-77)</td>
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February 14
Interview with Peter Cookingham
Reading: see course homepage

February 19
Interview with Jerry Caldwell
Reading: Hall, chapter 4 thru chapter 7 (pp. 78-145)

February 21
Lecture: Pursuing the Nature of the Gene
Reading: see course homepage

February 26
Lecture: The Double Helix and the Secret of Life
Reading: Hall, chapter 8 thru chapter 11 (pp. 146-205)

February 28
Interview with Jim Smith
Reading: see course homepage

March 4 – Spring Break

March 6 – Spring Break

March 11
Lecture: The Quest for the Genetic Code
Reading: Hall, chapter 12 thru chapter 15 (pp. 206-293)

March 13
Lecture: All in a Day's Work: The Consequences of Uncovering the Genetic Code
Reading: see course homepage

March 18
Interview with Rob LaDuca
Reading: Hall, chapter 16 thru Epilogue (pp. 294-360)

March 20
Lecture: Is There Purpose in Nature?
Biotechnology Agenda meeting

March 25
Lecture: The Long Decline of Teleological Thought
Reading: Crichton, prologue thru CH018 (pp. 1-136)
March 27
Interview with Rebecca Grumet
Biotechnology Agenda meeting

April 1
Lecture: Communication and Control: Information Theory & Biology
Reading: Crichton, CH019 thru CH038 (pp. 137-267)

April 3
Interview with Cori Fata-Hartley
Biotechnology Agenda meeting

April 8
The Iconic Double Helix
Reading: Crichton, CH039 thru CH066 (pp. 268-401)

April 10
Interview with Reena Jain
Biotechnology Agenda meeting

April 15
Interview with Brad Shaw
Reading: Crichton, CH067 thru Author's Note (pp. 326-442)

April 17
Lecture: Molecular Politics in the ’70s: Controversies over Genetic Engineering and Patents
Biotechnology Agenda meeting

April 22
Biotechnology Agenda Convention
❖ Book Review Due

April 24
Conclusion and Review

April 29 (Tuesday) 10:00 to 12:00 noon
❖ Final Exam