"There is purpose, then, in what is, and in what happens in Nature."—Aristotle

"Absolutely no human reason ... can hope to understand the production of even a blade of grass by mere mechanical causes."—Immanuel Kant

“We can allow satellites, planets, suns, universe, nay whole systems of universe[s], to be governed by laws, but the smallest insect, we wish to be created at once by special agent.”—Charles Darwin

“The time may hereafter arrive, in far distant years, when the population of the earth shall be kept as strictly within the bounds of numbers and suitability of race, as the sheep on a well-ordered moor or plants in an orchard-house”.—Francis Galton

“The science of life can be established only through experiment, and we can save living beings from death only after sacrificing others.”—Claude Bernard

“By now there exists an almost total consensus of informed minds that the essence of life can be explained by the same laws of physics and chemistry that have helped us understand, for example, why apples fall to the ground and why the moon does not, or why water is transformed into gaseous vapor when its boiling point is exceeded.” —James Watson

“There are people [who] say, well, we’re playing god. And, you know, I have a straightforward answer: if we don’t play god, who will?”—James Watson

Course Description

In this course we explore the development of science from the ancient Greeks to the present, paying particular attention to the vexed question of whether or not there is “purpose” in nature. We also follow breaking developments in science, medicine and technology, as reported in the weekly newsmagazine New Scientist. By looking both backwards and forwards we will see how a historical understanding of science’s ever evolving technical content, philosophical foundations and sociological underpinnings helps prepare us to confront the monumental scientific promises and challenges of the twenty-first century.
If you have questions at any point in the semester about any aspect of the course, I strongly encourage you to visit me during office hours (or make an appointment, if the scheduled times are inconvenient).

My policy is to 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 for accommodations.

**Required Reading**

*New Scientist* (science newsmagazine: distributed in class)
LBS 133 Course Reader (distributed via email)
Robert Louis Stevenson, *The Strange Case of Dr. Jekyll and Mr. Hyde* (1886)
John Wyndham, *The Day of the Triffids* (1951)

**Requirements and Grades**

There are several coordinated components to LBS 133.

We will focus on reading, discussion and lecture for the first three quarters of the course. The final quarter will be devoted to instruction, work and discussion relating to your research paper.

Because of the importance of lecture and discussion, **attendance** is obligatory, and counts 3% towards your course grade. You are allowed one unexcused absences during the semester. Your grade will be docked one percentage point for each subsequent unexcused absences, 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.

In order to understand lecture and participate in discussion, it’s essential that you complete the week’s reading before class on Tuesday. Active and regular **participation** in discussion will allow you to exercise and develop fundamental intellectual skills: the ability to read unfamiliar documents; to analyze complex ideas critically and imaginatively; and to communication with precision and clarity. The discussion format requires a candid intellectual exchange in which you try out your own ideas and react critically and constructively to the ideas of others. Participation counts 6% towards your course grade.
**Discussion groups** will set reading lists and create study guides based on *New Scientist*. Everyone will participate in three groups during the semester. This work will count cumulatively **11%** towards your course grade.

There will be several **short assignments**, including quizzes on the assigned reading. Quizzes and short assignments will account cumulatively for **8%** of the course grade. You will receive a zero on any quiz missed because of an unexcused absence or not handed in on time. I will throw out your lowest quiz or short-assignment grade of the semester.

There will be an **exam** (April 8th), worth **17%** of the course grade. It will feature an essay question (based on reading and lecture) and short-answer identifications (based on lecture).

You will write two **short papers**, cumulatively worth **20%** of the course grade. A **research paper and related assignments** will count **35%** towards the course grade. See the assignment handouts for more details.

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

**IMPORTANT:** In order to pass the course, you must take the exam and meet the **final deadlines** for all paper assignments. I will schedule a make-up date for the exam only in cases of a **documented** medical problem or family emergency. **No exceptions.**

### Weight of Graded Components


<table>
<thead>
<tr>
<th>Assignment Type</th>
<th>Weight (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper on <em>DNA: Pandora’s Box</em></td>
<td>5%</td>
</tr>
<tr>
<td><em>Jekyll &amp; Mr. Hyde/ Triffids</em> Paper</td>
<td>15%</td>
</tr>
<tr>
<td>Research paper &amp; related assignments</td>
<td>35%</td>
</tr>
<tr>
<td>Exam</td>
<td>17%</td>
</tr>
<tr>
<td>Short Assignments</td>
<td>8%</td>
</tr>
<tr>
<td>Attendance</td>
<td>3%</td>
</tr>
<tr>
<td>Participation</td>
<td>6%</td>
</tr>
<tr>
<td>Discussion groups</td>
<td>11%</td>
</tr>
</tbody>
</table>

### Grade Scale

I will grade assignments on a 100-point scale, which translates into a grade on the 4.0 scale as follows:

<table>
<thead>
<tr>
<th>Grade (4.0)</th>
<th>Score Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0</td>
<td>100-93</td>
</tr>
<tr>
<td>3.5</td>
<td>92-88</td>
</tr>
<tr>
<td>3.0</td>
<td>87-84</td>
</tr>
<tr>
<td>2.5</td>
<td>83-77</td>
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<tr>
<td>2.0</td>
<td>76-68</td>
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<tr>
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<td>67-60</td>
</tr>
<tr>
<td>1.0</td>
<td>59-50</td>
</tr>
<tr>
<td>0</td>
<td>&lt; 50</td>
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</tbody>
</table>
**Course Website**

Course announcements, lecture outlines, lecture slides, instructions on creating a user profile on turnitin.com, the weekly extra-credit assignment and copies of all handouts are available on the course website:

http://www.msu.edu/course/lbs/133/bellon/

**Academic Misconduct**

The penalty for academic dishonesty is course failure. The Lyman Briggs Academic Honesty Policy defines academic dishonesty to include (but not be limited to): cheating on assignments or examinations; fabricating data; plagiarizing, which means misrepresenting as your own work any part of work done by another (this includes using substantial chunks of lightly or unmodified text from another source, even if you cite the source in your paper); 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 have the option of submitting all written assignments to turnitin.com, a plagiarism-prevention service.

http://www.turnitin.com/

You need the following information to enroll:

Class ID: 2121746
Password: Orchids1862

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

**Schedule**

<table>
<thead>
<tr>
<th>Date</th>
<th>Lecture, Readings and Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 8</td>
<td>Movie: <em>DNA: Pandora’s Box</em></td>
</tr>
<tr>
<td>January 10</td>
<td>Guest presentation: Chris Ganchoff</td>
</tr>
<tr>
<td></td>
<td>Reading &amp; Discussion: Leon Kass. René Descartes. Sahakian &amp; Morein-Zamir. (course reader)</td>
</tr>
<tr>
<td>January 15</td>
<td>Introductions</td>
</tr>
</tbody>
</table>
January 17
Lecture: Science and the Mastery of Nature: James Watson vs. Leon Kass
Reading & Discussion: *The Strange Case of Dr. Jekyll and Mr. Hyde* (entire book)

January 22
Lecture: Aristotle and “Purpose” in Nature
Reading & Discussion: *Jekyll & Hyde*; Aldous Huxley (course reader)

January 24
Lecture: Lucretius vs. Galen: Aristotelian Teleological Thinking in the Roman Empire
Preparing reading list and study guide for *New Scientist* discussion
Reading & Discussion: *The Day of the Triffids*, pp. 3-37
➢ **Paper on DNA: Pandora’s Box due**

January 29
Reading & Discussion: *The Day of the Triffids*, pp. 38-126
Preparing reading list and study guide for *New Scientist* discussion

January 31
Lecture: The Fall and Rise of Science in the Medieval West
Reading & Discussion: *The Day of the Triffids*, pp. 127-46; *Science’s Breakthroughs of the Years, 2007* (course reader)

February 5
Lecture: Teleology and God in Physics and Biology: Newton, Kant, Paley
Reading & Discussion: *The Day of the Triffids*, pp. 147-228

February 7
Introduction to the Research Project
Reading & Discussion: *Jekyll & Hyde, Triffids*. Bio Fab Group. Stix. (course reader)

February 12
Lecture: Charles Darwin and the Search for the Laws of Biology
Reading & Discussion: *New Scientist* (led by the West Team)

February 14
Lecture: Charles Darwin’s “Considerable Revolution”
Reading & Discussion: *New Scientist* (led by the East Team)

February 19
Lecture: “Sheep on a Well Ordered Moor”: Francis Galton and Eugenics
Reading & Discussion: *New Scientist* (led by Biology Team 1)

February 21
Lecture: Stirring the Throbbing Ground of Life: Claude Bernard and Vivisection
Reading & Discussion: *New Scientist* (led by Chemistry Team 1)

February 26
Lecture: Vivisection and the “Soul, Thought, Poetry and Passion” of Animals
Reading & Discussion: *New Scientist* (led by Calculus Team 1)
February 28
Lecture: The Lords of the Fly: *Drosophila* and Modern Genetics
Reading & Discussion: *New Scientist* (led by Biology Team 2)
➢ Research proposal due

March 4—**Spring Break**

March 6—**Spring Break**

March 11
Lecture: “Yea, I have Goodly Heritage”: Eugenics in the United States
Reading & Discussion: *New Scientist* (led by Chemistry Team 2)

March 13
Lecture: Immigration Restrictions and Sterilization Laws: Protecting America’s Bloodlines
Reading & Discussion: *New Scientist* (led by Calculus Team 2)

March 18
Lecture: “We Are Closer to Darwin Now”: Genetics and the Triumph of Natural Selection
Reading & Discussion: *New Scientist* (led by Calculus Team 3)

March 20
Lecture: Before the Double Helix
Reading & Discussion: *New Scientist* (led by Chemistry Team 3)

March 25
Lecture: Watson and Crick Discover the “Secret of Life”
Reading & Discussion: *New Scientist* (led by Biology Team 3)
➢ Paper on *New Scientist, Jekyll & Hyde, and Triffids* due

March 27
Lecture: Molecular Biology, Cybernetics and the Book of Life
Reading & Discussion: *New Scientist* (led by Calculus Team 4)

April 1
Lecture: Information, Evolution, Teleology, Teleonomy
Reading & Discussion: *New Scientist* (led by Chemistry Team 4)

April 3
Reading & Discussion: *New Scientist* (led by Biology Team 4)
Review for exam

April 8
**EXAM**

April 10
Peer group meeting

April 15
Work on research paper; individual consultation with Prof. Bellon

April 17
Work on research paper; individual consultation with Prof. Bellon

April 22
Peer group meeting
➢ Draft of research paper due

April 24
Peer group meeting
➢ Critiques of peers’ research papers due

May 1 (Thursday, 3:00 to 5:00pm)
Movie: Gattaca (1997)
➢ Final draft of research paper due