

**Syllabus for BIOL 2000
Biology in the News**

**A critical thinking seminar course
3 credits, Spring 2014**

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Office hours: By appointment or drop-in.

Class meeting time: Tuesdays and Thursdays, from 11:00-12:15 in 220 Long Hall

Late policy: You may leave class if the instructor has not arrived by 11:15.

Course Description: For non-science majors. This is a small-enrollment, discussion course that explores the power and reach of modern biology. It emphasizes the close reading and analysis of original sources, and the development and presentation of reasoned arguments both orally and in writing. Students are introduced to this process through targeted lectures and the examination of others' published works, but later develop and defend their own opinions.

This course is intended to develop critical thinking skill that students can use through college and beyond, as part of the Clemson Thinks² program. This is an ambitious and experimental effort to transform undergraduate education through the intentional teaching and practice of critical thinking skills in sophomore-level classes (<http://www.clemson.edu/assessment/thinks2/>). As part of this effort, we will measure critical thinking skills at the start and end of the course, and use the results of those tests and other feedback to move the course toward these goals.

Pre-requisites: ENGL 1030.

Satisfies the Natural Science Requirement for General Education.

Approved as a Critical Thinking Seminar.

Required materials: There is no textbook for this course. Instead, students will be expected to read or watch articles or other media which will be provided.

Recommended reading: *Critical Thinking: A Student's Introduction*, 4th edition, 2010. Gregory Bassham, William Irwin, Henry Nardone, James Wallace, ISBN-10: 9780073407432. A copy will be placed on reserve in the library.

General goals

1. Students will develop university-level competence at the activities that characterize critical thinking
2. Students will describe the specific activities that characterize critical thinking and to reflectively report on their own use of these tools.
3. Students will apply critical thinking skills to solve problems that occur outside the academic classroom.

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Learning Outcomes

Clemson Thinks² Learning Outcomes	Outcomes realized in this course
Explore complex challenges	<p>Students will be able to find and evaluate relevant sources of factual information.</p> <p>Students will be able to evaluate arguments for adherence to facts, avoidance of bias and false reasoning, logical structure, and other ways people mislead others or themselves.</p>
Analyze multi-dimensional problems	<p>Students will understand that many of these applications are controversial, and their use raises ethical, moral, religious, political and/or economic considerations.</p> <p>Students will be cognizant and respectful of divergent opinions on these issues, especially ones based on well-reasoned arguments.</p>
Extrapolate from one conceptual context to others	<p>Students will be able to integrate the science underlying important issues in biology with ethical, moral, religious, political and/or economic considerations.</p> <p>Students will be conversant with modern applications of biology to our lives (health, sport, medicine and diet), our economy (agriculture, manufacturing), and environment (conservation, climate change, etc.).</p>
Synthesize alternative solutions to multi-dimensional challenges	<p>Students will be able to evaluate both scientific developments and their larger societal impacts, through reading and analysis of the works of others, and define their own positions on these issues.</p>
Communicate effectively, complex ideas	<p>Students will be able to present and defend their own opinions on important scientific issues, both orally and in writing.</p>

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Course outline: Initially, there will be a mix of lectures and discussions on selected aspects of critical thinking, using examples from current topics in biology. Later, the students will apply these skills in discussing and defending their own oral and written arguments, on a broader range of biological topics.

- Week 1: Pre-test on Critical Thinking skills
 Lecture: Introduction to the course, and to critical thinking
 Discussion: Comparison of opposing opinions on some important topic.
- Week 2: *Lecture:* What is an argument, and what are the roles of facts, logic, reasoning and opinion.
 Discussion: Critical analysis of two arguments for the same side
- Week 3: *Lecture:* How to detect bias, logical fallacies and other sources of mischief
 Discussion: Critical analysis of opinions on an inflammatory subject
- Week 4: *Lecture:* A call for precision and care in writing
 Discussion: Examples of common errors, and best and worst practices, to inoculate students against making the same errors
- Week 5: *Lecture:* Putting it all together and proving your case
 Discussion: Examples of great opinion pieces, from different perspectives
- Week 6 +: *Student-led discussions on selected topics*
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- Final week End of semester test on Critical Thinking Skills, followed by open discussion on how the students viewed this experience, and how it might be improved the next time.

Suggested topics.

We will select topics based on student and instructor interests, and the news of the day.

Possible topics include:

Where do we draw the line in genetic treatments: for life threatening illnesses, lesser ailments, sports, vanity?

Should students be allowed to use drugs to help them focus and be successful? What about surgeons, soldiers, or even their professors?

Do the benefits outweigh the risks of genetically modified foods?

Should governments tax or otherwise restrict access to fat foods, for our own good?

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What is PTSD, and does it arise in stressful situations other than combat? What should sufferers know, and what is society's obligation to them?

Biomimicry: capitalizing on nature's inventions in medicine, chemistry and materials science.

What is global warming, and how far should we go to avoid its effects? Would you support altering the earth's climate through geo-engineering?

Should we clone recently extinct species such as mammoths, sabre-toothed cats, and dodos and, if we do, where do we put them?

What is the proper treatment of animals in food production and product testing, and as pets?

The promise and perils of stem cells.

Grading: We will focus on one topic each week, and discuss readings or other source materials that provide the scientific background as well as competing perspectives. One or two students will select the topics and material a week in advance, give a brief introduction at the start of class, the lead the discussion. Discussion leaders will be graded on their knowledge of the material and how they lead the discussion. All others will be graded each week on their knowledge of the material based on the reading, and on their participation in the discussion. Finally, every student will be required to write a 750 word essay on a total of 6 of the topics, three in the first half of the semester and three in the second half. Some will be graded by other students and then the first draft, the students' grades and comments, and the subsequent revisions will all be turned in to the instructor. There may be short midterm and final exams, or a larger, final project.

Final letter grades will reflect the standard scale (e.g., 90-100 is an A), based on grades in the course weighted according to this scheme.

Leading discussions	10%
Participation in all discussions	30%
Short papers	40%
Exams and/or Final project	20%

Critical thinking artifacts: Any of these essays should be suitable for critical thinking artifacts for EPortfolio, though the students may wish to show one that was critiqued by others and then revised to meet those criticisms.

Attendance policy: *"College work proceeds at such a pace that regular attendance is necessary for each student to obtain maximum benefits from instruction. Regular and punctual attendance at all class and laboratory sessions is a student obligation, and each student is responsible for all work, including tests and written work, in all class and laboratory sessions. No right or privilege exists*

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that permits a student to be absent from any given number of class or laboratory sessions except as stated in the syllabus for each course. At the same time, it is obvious that students have valid reasons for missing classes; the instructors are expected to be reasonable in the demands they place on students."

This course is centered on open discussions, so students are required to attend *all* classes. Absences will be forgiven 1) if a student has a predictable conflict related to an official University business or function and the instructor is notified in writing in advance, or 2) if there is a compelling personal need or emergency, including illness; or death of a family member or close friend, and the instructor is notified in writing within one week of returning to class, with supporting information. Students who miss a class may be asked to write a short paper with their own critical thoughts on the reading. Students with more than 2 unexcused absences may be dropped from the class.

Disability access statement: *"It is University policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities. Students are encouraged to contact Student Disability Services to discuss their individual needs for accommodation."*

Academic Integrity: *"As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a 'high seminary of learning.' Fundamental to this vision is a mutual commitment to truthfulness, honor and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form."*