Biology 375: Introduction to Scientific Thinking - Spring 2014
Sterling 1339
Tue/Thur
Sect 6: 1:00 - 2:15    Sect 7: 2:30 - 3:45

Course Instructors:
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Jaye Gardiner - jcgardiner@wisc.edu

Office Hours:
By appointment

Got Questions?
When sending email please put Biology 375 in the subject line of your email. I will do my best to respond to your email within 24 hours (or the next business day, M-F) of reading it.

Course Description
Biology 375 will be primarily discussion-based and focuses on understanding the scientific process and not on memorizing a lot of “facts”. Instead we will work with five core biological concepts that drive biological research. We will dissect scientific articles from the popular press (newspapers or popular magazines) based on current and exciting areas of biology research. For each article, we will identify the hypothesis, determine how the experiments were conducted, analyze the data, evaluate the authors’ claims, and think of the next experiment. We will compare the claims and conclusions of the popular press articles with the primary research papers. We will also examine the process of science and have the opportunity to meet with researchers from our campus working on similar research topics.

Learning Goals
By the end of this course, we expect that you will have the skills to do the following:

- Critically read and evaluate scientific articles from the popular press
  - Use concept maps to organize complex ideas
  - Recognize misinterpretations between popular press and academic journal articles
- Identify and clearly state the hypothesis being tested
  - Understand how an experiment tests a hypothesis
- Understand the experiments researchers used to test that hypothesis
  - Design and draw your own experiments that would test a hypothesis
  - Understand the importance of and be able to design experimental controls
  - Critically analyze the design of your experiment and other proposed experiments
• Critically analyze data from figures
  ○ Understand how to interpret images, graphs, charts, and tables
  ○ Draw your own figures to represent data (real or imaginary)

• Identify new questions based on the study
  ○ Create new hypotheses that can be tested in the future

• Be able to explain how a research question relates to the five core biological concepts
  • Be able to identify the five core concepts of evolution, structure and function, information flow, transfer of energy, and systems

• Understand Science from a Scientist’s perspective
  ○ Recognize the value of creativity and collaboration in designing experiments
  ○ Recognize the value of diverse perspectives in science
  ○ Understand the scientific process is dynamic, not static or always predictable

**Attendance**
You are expected to attend all class meetings. This course is designed around student participation, group discussion and assignments, therefore, it is essential that everyone attends and participates in class. Students may be excused from class with prior notification to the instructors and is subject to the instructors discretion. Failure to do so will result in an unexcused absence that will affect your participation grade, which is XX% of your total grade. You are still responsible for completing all course materials and turning them in on time for excused absences.

**Grading Criteria:**

25% **Portfolio**
During the semester you will, as a class and individually, build a portfolio that will chronicle your work. You can think of your portfolio as a lab notebook, and you may use it as a reference during exams. The portfolio will contain all your classwork, homework, concept maps, and evaluations of grant panel reviews. Periodically your portfolio will be checked for completeness. Portfolios will be collected and graded several times during the semester.

25% **Homework**
Homework is due at the beginning of class. Late assignments will drop by 50%.

25% **Participation**
Your participation grade will consist of your attendance and contribution to class discussions. For each class, you can receive 1 point for attendance and 2 points for participation.

25% **Exams**
There will be an open portfolio midterm exam during the semester and a final. There will be quizzes throughout the semester.
A: 93-100% (Excellent)
Exceeds expectations. Incorporates new ideas or connects course ideas in new ways. Well organized, clear, professional. Work demonstrates critical thought. Participation includes contributing clear, well-considered, creative ideas, promoting group discussion, asking thoughtful questions about others’ ideas and responding well to questions.

AB: 88-92% (Intermediate grade)
Exceeds expectations. Demonstrates a deep understanding of the material. Well organized, clear, professional. Work demonstrates critical thought. Participation includes contributing clear, well-considered, creative ideas, promoting group discussion, asking thoughtful questions about others’ ideas and responding well to questions.

B: 80-87% (Good)
Meets expectations. Work is well organized and clear. Regular and respectful contributions to class and group discussions. Ask questions.

BC: 75-79% (Intermediate grade)
Directions were followed and work indicates that student understood the concepts of the assignment. Regular and respectful contributions to class and group discussions.

C: 67-74% (Fair)
Directions were followed. Regular and respectful contributions to class and group discussions.

D: 60-66% (Poor)
Directions were not followed and a significant portion of the work was not turned in or was incomplete. No meaningful participation in group discussion.

F: 0-59% (Failure)
Work was not turned in.

Schedule
Over the course of the semester we will delve into four to five research projects. We will use one or more popular press articles supplemented with data and information from the original primary research. We will use a variety of discussion based techniques to understand the biological questions and the experiments that were conducted. We will conclude each project by considering future research possibilities.

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<tr>
<th>Weeks</th>
<th>Potential Topic</th>
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<tbody>
<tr>
<td>1-3</td>
<td>Elephant communication</td>
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<td>4-6</td>
<td>Violent Fruit Flies</td>
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<td>7-9</td>
<td>Inheritance of stress and fear</td>
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<td>10-12</td>
<td>Young blood, old mice</td>
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<td>13-15</td>
<td>Conversations with Faculty</td>
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Respect
This class hinges on group work and discussion, therefore it is important that we all remain respectful of each other while providing and receiving feedback on each other’s work. While you might not agree with the opinions of your classmates (and we don’t always expect you to!), it is important to allow others to fully develop their ideas and to provide constructive rather than destructive criticism. Constructive criticism is well reasoned feedback on others’ work in a professional manner as opposed to personal attacks. Additionally, respect the time of your instructors and classmates by coming to class prepared and turning your work in on time. This will allow for productive discussions during class time and efficient return of feedback to you.

Academic Integrity
This course is designed to help you develop creative and critical thinking skills. Thus, it is imperative that you create your own work. While some assignments will require you to collaborate with your peers, we expect that all submitted work will be of your own creation.

Academic misconduct will not be tolerated and includes cheating on exams and plagiarism. Plagiarism is defined as using words or ideas of another person as your own without giving that person credit.\(^1\) The best way to avoid plagiarism is to develop your own ideas. If you find that you need to use words and ideas from another source, then you need to properly cite the reference. The UW Writing Center is an excellent campus resource that can help you properly cite your references.

If academic misconduct or plagiarism is thought to have occurred, we will meet with you in person for an explanation. If we conclude that plagiarism or academic misconduct has occurred, you will receive a score of 0 on that assignment or exam. Occurrences of plagiarism and academic misconduct will be reported to the Dean of Students.

Accessibility
Your success in this class is important to us. If there are circumstances that may affect your performance in this class, please let us know as soon as possible so that we may work together to develop strategies for adapting assignments to meet both your needs and the requirements of the course. The McBurney Disability Resource Center (263-2741) provides resources for students with disabilities. You will need to provide documentation of disability to them in order to receive official university services and accommodations.

Please don’t hesitate to let us know if you require assistance or accommodations for any reason. We look forward to working with you to meet your learning goals.

Resources
There is no textbook associated with this course. Information related to this course can be found on Learn@UW. Please check the Learn@UW website frequently.

It is expected that you will check your University of Wisconsin email. In addition to posting course material on Learn@UW, we may find that we need to contact you through email.

- LearnUW learnuw.wisc.edu
- UW Writing Center writing.wisc.edu
- UW DesignLab designlab.wisc.edu
- Research Opportunities grad.wisc.edu/education/diversity/srop/
  http://www.nsf.gov/crssprgm/reu/
  biology.wisc.edu/Undergraduates-
  GettingInvolvedBeyondtheClassroom.htm