**SLHS 270:**

*Scientific Thinking*

**Professor:** Dr. Andrew Lotto  
**Office:** SPH 207C  
**Phone:** 621-9841  
**Email:** alotto@email.arizona.edu  
**Office Hours:** By Appointment

**Class Location:** CHEM 134  
**Class Day/Time:** TR 2:00-3:15pm  
**Class Website:** D2L

**Course Description:** This course is about scientific thinking and an appreciation of the achievements and constraints of science. Whereas the examples will often be from the field of Speech, Hearing and Language Sciences, the course is a general introduction to the methods, techniques and art of science. Some of the course will be devoted to learning basic methods and concepts in scientific research such as experimental design, manipulation of independent and dependent variables and statistical analysis. However, the majority of the course is devoted to a discussion of how to interpret scientific findings, how to determine if a question is scientifically answerable and how to use science to inform therapies and our everyday lives. The course is designed to be extremely interactive both during class time and online outside of class. Opportunities for practicing scientific thinking and intuition will be offered throughout in order to strengthen these mental abilities. In addition, participants will be provided opportunities to interact with scientists to appreciate their drive and passion and what questions they feel need to be answered in their field.

**Learner Outcomes:**

1) Describe what types of questions are potentially answered by science  
2) Understand what kinds of information are provided by scientific studies and what constraints exist  
3) Describe common errors in popular reports of scientific findings  
4) Understand the need for statistical analysis and the basic concepts involved  
5) Describe how scientists determine which questions are interesting  
6) Recognize common violations of logic and interpretation errors
Course Structure:

Classes will generally be lecture/discussions of two types: 1) Descriptions of concepts and definitions in science and research; and 2) guest lectures by scientists at various stages in their careers. Both types of lectures are expected to be interactive with plenty of opportunity to ask questions and make comments. In addition, discussion will be continued on the D2L system. Students will be asked to comment on the lectures on D2L.

Reading Materials

Popular press articles as well as other sources (tutorial articles, web pages, etc.) will be posted on D2L. It will be the responsibility of the student to regularly check D2L to see when readings and assignments are available.

Required Clicker and Clicker Instructions:

You are required to have your own Turning Technology clicker, which can be purchased in the bookstore. You should bring your clicker to each class. These will be used for in-class quizzes and review sessions before each exam. While the in-class quizzes are not graded, they can contribute to your extra credit points (explained below).

There is an option of using an Internet-capable device (such as a cell phone or laptop) as your clicker. This option is only recommended for 3rd- or 4th-year students who will not need a clicker in future classes. Not all classes allow cell phone or laptop use, so unless you are sure you will not need a clicker in a future class, it would be unwise to choose this option, as you may be required to buy an actual clicker in another class.

To review both options and for online instructions, please visit: http://uits.arizona.edu/services/classroom-response-devices/student

Once you have purchased a clicker, you need to register it. Please do so by January 19th. In-class quizzes will begin on this day. If you do not have your clicker registered by then, you will not be eligible to start acquiring points towards your extra credit until you have done so.

Instructions for clicker registration and class registration can be found at: http://arizona.turningtechnologies.com
(or alternatively: http://uits.arizona.edu/services/classroom-response-devices/instructions)

The instructor email for this class is alotto@email.arizona.edu. The class that you should select is SLHS 270.
Grading Policy:

Exams:
There will be 3 exams that will test knowledge of presented information as well as synthesis and application of this information to novel situations. Exams will be multiple-choice and short-answer format.

- We are unable to provide extended time on tests within the department. If you and the DRC determine that this is an appropriate accommodation, you must arrange to take tests at the DRC testing center. These arrangements will need to be made in the first three weeks of class.

Written Assignments:
There will be several written assignments during the semester. These assignments will be responses to particular questions based on a provided scenario. The purpose of these assignments is to determine your ability to present a reasonable argument for a position and to interpret data correctly. These assignments will be short (2 pages – double spaced). As a result, you will need to be concise and “to the point” in your writing.

A Final Position Paper will be due Finals Week. This paper will be slightly longer (4 pages) and will reflect your views of science at the end of the semester. **All written assignments must be written in Times New Roman Font (size 12), be double-spaced, and have one-inch margins around all sides.

Online Discussions: Throughout the semester you will be asked to provide short commentaries on lectures, guest lectures and readings. It is the responsibility of the student to regularly check D2L to determine if such a discussion is assigned and when it is due. These commentaries should be based on insights that the student has regarding the particular topic and questions that the lecture/reading raised in the mind of the student. The Professor will look over these commentaries and choose some questions and comments to repeat in class (anonymously). In addition, some commentaries may receive extra points if they are outstanding in terms of the depth of the commentary.

Extra Credit:
There are three ways to earn extra credit. The maximum number of total extra credit points that can be earned is 5 (total across the three extra credit types). These points will be added after the total of all exams (curved), written assignments, and discussion scores have been added together (i.e., these points are added to your final grade).

(1) In-Class Clicker Questions - Students can obtain 1 extra credit point for responding in 80% of the classes that include clicker questions (whether or not they responded correctly).

(2) Experiment Participation - Students can obtain 1 extra credit point per hour (or part of an hour) for participating in experiments. A list of appropriate experiments with contact information will be posted on D2L. Signed forms must be turned in by the due date of the final paper to receive extra credit. Other experiments on campus may be appropriate substitutions. These experiments must be approved by Dr. Lotto.
**If a student signs up to participate and misses an experiment two times (or is more than 5 minutes late two times) without contacting the experimenter at least an hour prior to his or her designated time, the student will no longer be able to participate in experiments for extra credit.**

(3) **Research Papers** - A three-page paper summarizing and evaluating a research article on speech, hearing, music or acoustics is worth 1 extra credit point. The paper must follow the same formatting as listed above for the written assignments. The article(s) must be pre-approved by Dr. Lotto.

**Grading:**

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<th>Percentage</th>
<th>Grading (ALL)</th>
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<tbody>
<tr>
<td>3 Exams</td>
<td>60% of overall grade</td>
<td>A</td>
<td>90-100%</td>
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<tr>
<td>Final Paper</td>
<td>10% of overall grade</td>
<td>B</td>
<td>80-89.9%</td>
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<tr>
<td>Written Assignments</td>
<td>20% of overall grade</td>
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<td>70-79.9%</td>
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<tr>
<td>Online Discussions</td>
<td>10% of overall grade</td>
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<td><strong>TOTAL:</strong></td>
<td><strong>100%</strong></td>
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<td>below 60%</td>
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<td>Extra Credit</td>
<td>Up to 5 Points</td>
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**Attendance Policy:**

- Students are expected to attend all class periods. Exam questions are taken mainly from the material from class and students will be responsible for this material.
- All holidays or special events observed by organized religions will be honored for those students who show affiliation with that particular religion.
- Absences pre-approved by the UA Dean of Students’ office will be honored.

**Exam Schedule:**

Exam #1: February 9th  
Exam #2: March 8th  
Exam #3: April 14th  
Final Paper: May 9th (5:00) – Extra Credit also Due

**Late Work Policy:**

Unless a later due date is pre-approved by the instructor, late assignments will be docked by 10% of possible points for each day after the assigned due date.

**Regrading Policy:**

There will be no regrading of papers or exams. All grades are final.
**Classroom Behavior:**

All cell phones and pagers must be turned off or placed on vibrate prior to the start of class and may not be answered in class. This policy also applies to sending or receiving instant messages.

The Arizona Board of Regents’ Student Code of Conduct, ABOR Policy 5-308, prohibits threats of physical harm to any member of the University community, including to one’s self. See: [http://policy.web.arizona.edu/threatening-behavior-students](http://policy.web.arizona.edu/threatening-behavior-students).

**Accessibility and Accommodations:**

It is the University’s goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let me know immediately so that we can discuss options. You are also welcome to contact Disability Resources (520-621-3268) to establish reasonable accommodations.

Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

**Student Code of Academic Integrity:**

All students are expected to know and abide by the Code of Academic Integrity. Conduct prohibited by the Code consists of all forms of academic dishonesty, including, but not limited to: cheating, fabrication, facilitating academic dishonesty, and plagiarism as set out and defined in the Code of Conduct, failure to observe rules of academic integrity established by the faculty member for a particular course; and attempting to commit any act prohibited by the Code. A violation of the Code may result in a report of the incident being sent to the Dean of Students and a copy of that report being filed in the student’s departmental records. The complete Code of Academic Integrity can be found at [http://catalog.arizona.edu/policies/974/acacode.htm](http://catalog.arizona.edu/policies/974/acacode.htm).

**Confidentiality of Student Records:**

[http://www.registrar.arizona.edu/ferpa/default.htm](http://www.registrar.arizona.edu/ferpa/default.htm)

**Subject to Change Statement:**

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.