

**Department of Earth Sciences**  
**GEO 306 -- Science, Pseudoscience and Fraud**  
**Spring, 2008 Syllabus**

<i>instructor, office:</i>	Dr. Paul Tomascak, Piez 207a
<i>meeting place, time:</i>	Piez Hall, rm. 221; Mon.+Wed.+Fri. 1:50 - 2:45 p.m.
<i>office hours:</i>	Mon.+Wed.+Fri. 10:15 - 11:15 a.m., and by arrangement (open door)
<i>phone and email:</i>	315.312.2786, <tomascak@oswego.edu>
<i>course web site:</i>	<a href="http://www.oswego.edu/~tomascak/ptgeo306.html">http://www.oswego.edu/~tomascak/ptgeo306.html</a>

**required books:** (supplemental readings will be issued throughout the semester)

Dawkins R (2000) *Unweaving the Rainbow: Science, Delusion and the Appetite for Wonder*.  
Mariner Books. 352 p.

Hines T (2002) *Pseudoscience and the Paranormal*. Prometheus Book, New York. 500 p.

Sagan C and Druyan A (1996) *The Demon-Haunted World--Science as a Candle in the Dark*.  
Ballentine Books, New York. 457 p.

Wynn CM and Wiggins AW (1997) *The Five Biggest Ideas in Science*. John Wiley and Sons,  
New York. 200 p.

**catalog description:** A multi-disciplinary course derived in equal parts from understanding natural phenomena in terms of basic science, unmasking the profound nature of scientific principles and applying them to everyday life. The course will focus on uncovering topics that are 'messy' and intellectually complex rather than ones that have 'right answers' or are contrived 'cook book' experiments. Sub-themes in the course will allow students to experience a scientist's sense of triumph through rational thinking by exposing specious arguments (pseudoscience) and charlatans (fraud), such as Creationism, Dowsing, Pyramid Power, Astrology and Living Dinosaurs.

**course grade:** 20% term paper; 10% presentation of semester project; 15% review paper; 35% short assignments; 20% Final Exam.

**notes on the course grade:** Note that assignments will receive a 10% penalty per day late, including weekends/holidays.

1. Each student will complete a **term paper**. Topics for the paper will be assigned, although they may be negotiated. Details on requirements for the paper are given on a separate sheet.
2. Each student will deliver a 10-minute **oral presentation** accompanying the term paper. Presentations will fill the final four weeks of class. The order of speakers will be determined by horoscope reading (i.e., randomly). Details on format of the presentation are given on a separate sheet. Note that if you are not present on the scheduled day for your presentation, you will receive a zero for the assignment (no last-minute rescheduling).
3. Each student will write a **review** of Richard Dawkins, *Unweaving the Rainbow*. Details on format of the review are given on a separate sheet.
4. **Short assignments** include things completed in class and those issued following or to preface class discussions, generally about once per week. Details on format of these will be given out individually. Note that if you are not present on a day when a short assignment is conducted, you receive a zero.
5. The comprehensive **Final Exam** will deal with topics emphasized most heavily during the course. Details will be given in the latter half of the semester.

***attendance and disability:*** Excuse of absence (and hence availability of make-up assignments) for reasons of illness requires verification with adequate documentation. Those who will miss class because of SUNY-sponsored activities must declare their schedule during the first two weeks of the semester in order for this to be a valid excuse for absence. If you will be absent for reasons of religious observation, you must contact me at least one week in advance to arrange a make-up assignment. If you have a disabling condition, which may interfere with your ability to successfully complete this course, please contact the Office of Disability Services (312.3358).

***academic integrity:*** All students are responsible for upholding the University's high standards of academic integrity in this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. We will review the nature of plagiarism in class. Students will be required to include a statement with all writing assignments stating that you are aware of the College policy regarding academic integrity. For clarification of the policy see page 187-188 in the 2007-2008 Undergraduate Catalog, or [http://www.oswego.edu/administration/registrar/policy\\_text.html](http://www.oswego.edu/administration/registrar/policy_text.html)

## GEO 306 -- S.P.F. -- Schedule, Spring 2008

This is a tentative schedule of events for the semester.

Changes will be announced in class and posted on the course web site.

<b>week/dates</b>	<b>topics</b>	<b>reading</b>
<b>week 1</b> 1/25	Scope of the course and expectations	
<b>week 2</b> 1/28, 1/30, 2/1	Science, belief, pseudoscience, junk science; Baloney detection: how to avoid getting duped	Hines Ch. 1; Sagan Ch. 1, 2, 12 & handouts
<b>week 3</b> 2/4, 2/6, 2/8	Five Biggest Ideas in Science (Physics, Chemistry)	Wynn & Wiggins Ch. 2, 3
<b>week 4</b> 2/11, 2/13, 2/15	Five Biggest Ideas in Science (Biology); Evolution v. Creationism	Wynn & Wiggins Ch. 6 handouts
<b>week 5</b> 2/18, 2/20, 2/22	Evolution v. Creationism; Five Biggest Ideas in Science (Astronomy)	handouts & Wynn & Wiggins Ch. 4
<b>week 6</b> 2/25, 2/27, 2/29	Five Biggest Ideas in Science (Geology) & Hot topics in science	Wynn & Wiggins Ch. 5 & handouts
<b>week 7</b> 3/3, 3/5, 3/7	Living dinosaurs and paleontological hoaxes	Hines Ch. 6 & handouts
<b>week 8</b> 3/10, 3/12, 3/14	Perversion of science: What 4 out of 5 dentists really think	Sagan Ch. 14 & handouts
<b>week 9</b> 3/17, 3/19	Life after death: Seeing things that aren't there <i>no meeting Fri. 3/21 (Good Friday)</i>	Hines Ch. 3; Sagan Ch. 6
<b>week 10</b> 3/24, 3/26, 3/28	<b>Spring Recess -- no class meetings</b>	
<b>week 11</b> 3/31, 4/2, 4/4	UFO's, abductions, etc.: Seeing more things that aren't there	Hines Ch. 7, 8; Sagan Ch. 3, 4, 5, 6
<b>week 12</b> 4/7, 4/9, 4/11	ESP & Astrology: Numbers games and predicting the unpredictable	Hines Ch. 2, 4, 6
<b>week 13</b> 4/14, 4/16, 4/18	Student presentations	
<b>week 14</b> 4/21, 4/25	Student presentations <i>no meeting Weds. 4/23 (Quest)</i>	
<b>week 15</b> 4/28, 4/30, 5/2	Student presentations	
<b>week 16</b> 5/5, 5/7, 5/9	Student presentations	
<b>Mon. 5/12</b>	<b>Final Exam: Piez rm. 221, 2:00 - 4:00 p.m.</b>	

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**Guidelines for Assignments**

All written assignments you turn in must follow this format:

- double spacing
- 1" margins on all sides
- a 12-point font
- pages numbered sequentially
- cover page or header with: student's name, date, course number, title of assignment, word count (if you don't know how to get your word processor to give you this, ask me)

I reserve the right to not accept any paper that does not follow these elements. Note that "technical difficulties" will not be considered a valid excuse for late assignments. *All late assignments* will receive a 10% penalty per day past due, including weekends/holidays.

Although I will not have time to formally critique rough drafts, I am happy to give a cursory review and make recommendations to any pieces of text, or to offer other suggestions if you feel "stuck" at any point in your writing. If you are not a confident writer, I recommend the following, in addition to getting my help: (1) get friends or classmates to review and proofread your work; (2) make an appointment with the Writing Center on campus to have your work assessed by their experts.

**review** of Richard Dawkins, *Unweaving the Rainbow*, **due Friday 3/7/08**

In this assignment, I am looking for two things: (1) an overall summary of the work; (2) illustration of deeper critical thinking on any three chapters you choose. I will not enforce word limits, however, it will be difficult to adequately critique this work with fewer than 750 words.

When I evaluate the papers, I will be looking for the following:

- demonstration of understanding the central themes of the book;
- effective use of *specific examples* from the book to support your critique (i.e., not just picking random pages to write about);
- demonstration of critical thinking and connection to the goals of the course;
- ideas consolidated into a cohesive and concise piece of work--neither excessively wordy nor unnecessarily brief;
- evidence of spell-checking and proofreading;
- technical correctness (following guidelines, use of correct mechanics and grammar, proper reference citations).

It is important to understand that a "critical" review is not the same thing as a reaction piece.

Although I am interested to know if you found the book worthwhile, the point of this review is to demonstrate that you understand what is being discussed and to examine the effectiveness of Dawkins' arguments. Do not write a rant!

**term paper**, **due Friday 4/11/08** (outline due Wednesday 3/19/08)

The paper will consider an aspect of pseudoscience, fraud, etc., not covered in depth during the course. Your goals are to describe the topic in a very complete fashion, emphasizing to what extent scientifically rigorous analysis provides support. The topic will be assigned from a random selection process. I recommend using reading logs for any article or book you read for your term paper. The purpose of the logs is twofold. First, they emphasize a focused approach to reading,

which generally produces better quality information transfer. Secondly, they are an effective tool for avoiding unintended plagiarism.

By **3/19/08** you should have the library research complete for your paper, or virtually so. On this date each student will turn in an **outline** of their paper, including the **title** and a list of pertinent **references**. Most of the topics have a body of citable references--I expect you to have a minimum of eight by this time. The internet may be a useful research tool, but in general web sites will not be accepted as citable references. Where web content is referenced, complete and accurate URL must be included. Non-web references should make up a significant majority.

I will not enforce word limits, however, for the given topics, a treatment with fewer than about 3000 words of text is probably inadequate. Each term paper will include the following sections: abstract, introduction, body, figures/tables (if appropriate), conclusion/summary, list of references cited using a consistent format. Illustrations and similar material should follow their reference in the text (i.e., not grouped at the end of the paper) and must be accompanied by original, informative captions.

The following components will be central to the evaluation of term papers:

- adherence to the outline;
- clear and thorough enumeration of the question/problem/phenomenon being addressed;
- demonstration of skeptical thinking and connection to the goals of the course;
- effective use of information sources;
- ideas consolidated into a cohesive and concise piece of work--neither excessively wordy nor unnecessarily brief;
- evidence of spell-checking and proofreading;
- technical correctness (following guidelines, use of correct mechanics and grammar, proper reference citations).

### **oral presentation**

Each student will have 10 minutes to give an overview of their term paper topic, followed by ~5 minutes for questions. Emphasis should be placed on the following criteria:

- clearly outlining the question/problem that was researched;
- establishment how the project contributes to the goals of the course (how good is the evidence of scientific merit?);
- demonstrating an organized approach;
- clear communication (speaking and graphical props)
- responding lucidly to questions.

The format of the presentation is at the discretion of the individual. Anyone needing electronic media projection must check with me at least 48 hours in advance in order to set things up to run smoothly.