SCIENCE, PSEUDOSCIENCE & SOCIETY
General Course Syllabus (subject to modifications)
11:628:114, 3 credits, Spring

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CONTACT: Please use Canvas (Click 'Inbox' on the left menu) for all communications.

COURSE DESCRIPTION

Science permeates all facets of society and has changed our planet for the better – through, for example, modern medicine – and for the worse – through increased air pollution brought on by the Industrial Revolution. Given the myriad ways that science affects society, it is imperative that everyone has a certain level of scientific literacy. But what is science and how is it conducted? Why are so many people skeptical of science? How does the public decide who to believe when you have groups of scientists debating completely opposite views? With the expansion of the internet and the explosion of social media platforms, information has never been more readily available and knowing how to tell 'what is real and legitimate science' from 'misinformation and what we want to believe' is more critical than ever before.

This course will introduce you to the concepts of science and pseudoscience and give you the tools for distinguishing between them. We will illustrate how tensions between science and pseudoscience have existed for centuries using historical examples from heliocentrism to smoking and cancer. We will then discuss more modern scientific controversies, including pressing issues (e.g. climate change) that students will face in their generation. This online course will draw material from public venues (e.g. newspapers, television), primary literature, and recommended reading.

Prerequisites: None

Required Reading: We will use the book, *The Skeptic's Guide to the Universe: How to Know What's Really Real in a World Increasingly Full of Fake* by Steven Novella. Please make sure you have a copy.

All other readings will be provided in each module.

CORE CURRICULUM LEARNING GOALS

The content and activities of this course satisfy the following SAS & SEBS Core-Curriculum Learning goals:

Contemporary Challenges – Our Common Future [CCO]

- CCO-2. Analyze the relationship that science and technology have to a contemporary social issue

Areas of Inquiry – Natural Sciences [NS]

- NS-1. Understand and apply basic principles and concepts in the physical or biological sciences
- NS-2. Explain and be able to assess the relationship among assumptions, method, evidence, arguments, and theory in scientific analysis

MODULE SCHEDULE

Date	Title
Module 1	Course Introduction What is Science? The Scientific Method
Module 2	What is pseudoscience? Identifying biases in our thinking Determining causation
Module 3	A Lesson from History: Heliocentrism
Module 4	Science and Public Health: Vaccinations
Module 5	Science and Public Health: Smoking and Cancer
Module 6	Genetically Modified Organisms
Module 7	The Apollo Moon Landing: Fact or Hollywood?
Module 8	Climate Change: The Debate, Evidence and Consequences
Module 9	Climate Change: The Cause, Climate Change Denial, the Solutions
Module 10	Plastics in the ocean
Module 11	Harvesting from the Oceans: Tragedy of the Commons
Module 12	Science, Media, and Communication
Module 13	Science, Government, and Policy

ASSIGNMENTS/RESPONSIBILITIES, GRADING & ASSESSMENT

Your grade is broken down as follows:

Item	**Value**
Homework Assignments	35%
Discussions	20%
Midterm Exam	15%
Final Scientific Controversy Project	30%

Everything is 'open book/notes' (e.g. homework assignments, the midterm, etc). You can (and should) use all of the resources *provided in this course*. The use of artificial intelligence tools such as ChatGPT, or

homework services such as Chegg, is *not permitted.* Students caught using these types of resources will be reported to the Dean of Students.

1. Homework Assignments (35%)

Modules will be posted weekly on Monday at 12:01am EST. Homework assignments will be labeled as such and will be posted at the end of the module and will be due every Friday at 11:59pm EST. Answers will be posted a few days after the deadline. Late assignments will not be accepted.

Weekly assignments will help you keep on track throughout the semester and demonstrate you are working through each module. However, as I do realize that 'life' does sometimes get in the way, everyone gets **1 free homework pass** meaning that your lowest homework assignment score will be dropped from your homework grade at the end of the semester. Use it wisely.

Some modules also have "surveys". There are no right or wrong answers so DO THEM because they are FREE POINTS. In other words, **SURVEYS = FREE HOMEWORK POINTS.** I am always surprised by the number of students who don't do these and then come back at the end of semester asking for extra credit. Don't be that student.

2. Discussions (20%)

An important part of the process of science is critical discussion and constructive debate, so part of your final grade will be based on discussion-based assignments. These assignments will (hopefully) stimulate interactions and class discussions, which are often lacking in a online course. Some discussions will be class-wide, some will be in small groups to which you are assigned. They will take on a variety of forms, such as a discussion board topic, or a social annotation assignment. Regardless of the format, you will be graded individually based on your contribution. Instructions and expectations will be provided for each assignment.

Basic netiquette (etiquette for online discussions):

- Be respectful and courteous when posting comments
- Use correct spelling, grammar and punctuation and write in complete sentences
- Do not type your entire comment in all caps, italics, or bold. This type of formatting should only be used when trying to emphasize a specific point
- It's ok (and encouraged) to disagree with something someone says, but personal attacks will not be tolerate
- Be brief, but clear. No one wants to read a 1 page comment, but we do want to understand your point

3. Midterm Exam (15%)

There will be one midterm exam posted online the day it is due. Once you open it, you will have 3 hours to complete it.

4. Scientific Controversy Final Project (30%)

Your final assignment is to demonstrate that you can use the tools you learn in this class and identify scientific and pseudoscientific sides of a contemporary scientific controversy of your choice. You will be allowed to work in groups of no more than 4 students and the format will be open to your creative input. Past projects have included: writing a song or a poem, creating a powerpoint, staging a debate, conducting an interview, or writing a paper. Your controversy topic, group members, and format **must be submitted for approval**.