

# Perspectives on Science and Math

UTeach/HIS 329U Fall 2016

Lecture: MWF 3-4, [PAI](#) 4.18

Discussion Section: M 4-5

Professor: Dr. Megan Raby  
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512-475-7925

TA:

Office Hours: [GAR](#) 0.114, arrange for alternative accommodations by email  
W2-3, W4-5, and by appointment

University Writing Center Course Specialist Consultant (CSC):

## Course Description:

Perspectives on Science and Math explores the intellectual, social, and cultural history of science and mathematics, focusing on the 17th century to the present. This is an upper-division history course designed for students in UTeach Natural Sciences. This course has four interlocking goals: to give you an overview of the history of science and math in order to broaden your understanding of subjects you will teach in the future; to enable you to put this broader history and context to work in science and math pedagogy; to improve your ability to research, analyze, and evaluate information; and to improve your writing and communication skills.

This is a Writing Flag course. It is designed to give you experience writing within an academic discipline—in this case, history. You can expect to write regularly during the semester, complete substantial writing projects, and receive feedback to help you revise your writing. You will also have the opportunity to read and discuss your peers' work. For more information about Writing Flag courses, see <http://www.utexas.edu/ugs/flags/students/about/writing>.

This course also fulfills the social and behavioral sciences component of the university core curriculum and addresses the following objectives established by the Texas Higher Education Coordinating Board: communication skills, critical thinking skills, empirical and quantitative skills, and social responsibility.

## Readings:

One required textbook is available for purchase at the Co-op. In addition, two copies are on reserve at PCL:

Ede, Andrew, and Lesley B. Cormack. *A History of Science in Society: From Philosophy to Utility*. 2nd ed. Toronto: University of Toronto Press, 2012.

For reference, we will also use a free, online handbook for students of history:

Rael, Patrick. *Reading, Writing, and Researching for History: A Guide for College Students*. Brunswick, ME: Bowdoin College, 2004. [www.bowdoin.edu/writing-guides](http://www.bowdoin.edu/writing-guides)

Additional required primary and secondary source readings listed in the schedule below will be posted on our course's Canvas site (<http://canvas.utexas.edu>). In addition to accessing course materials, you will also use Canvas to communicate and collaborate online, check grades, submit assignments, and complete online quizzes and surveys. Canvas support is available at the ITS Help Desk at 475-9400, M-F 8:00-6:00.

## Assignments and Evaluation:

Participation (includes attendance)	10%
Reading Comprehension/Reflection Questions	25%
Essays	25%
5E Lesson Plan Project (group project, graded individually)	40%

### *Participation*

Participation means active involvement in class discussion and activities, both in lecture and discussion sections. This includes coming to class prepared to discuss course readings (reading actively, taking notes, bringing the texts and notes for the day to class), speaking up to ask and answer questions during class, and collaborating actively with classmates in group activities. To participate, you must also attend class (see "Attendance" below). For more explanation, see the [Participation rubric](#) on Canvas.

### *Reading Comprehension/Reflection (C/R) Questions*

For most days that you have a reading assignment due, you will respond to a set of questions. Usually, these will be due by midnight the day before class, submitted on Canvas—late assignments will get half credit. Some questions will guide and assess your comprehension of historical material, others will be open-ended reflections on that material. Questions may draw on readings up to and including those scheduled for the upcoming class day. Unless otherwise noted, you may refer to course material for reference. Copying classmates' responses is an Honor Code violation, however. This category also includes occasional in-class writing, quizzes, activities, and peer reviews.

### *Essays*

Several short (1-6 page) essays will be assigned throughout the course. Late essays will lose half a grade (5%) for each day late. Some will require you to synthesize course material. Others will require independent research. They are intended to build your research, writing, and analytical skills.

### *5E Lesson Plan Project*

A core component of this course is a lesson plan that you will research, write, and present to your classmates. This lesson will incorporate a historical perspective to enhance the teaching of a science/math concept, the nature of science/math, and/or the role of science/math in society.

## Grading System

A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
100% to 94%	< 94% to 90%	< 90% to 87%	< 87% to 84%	< 84% to 80%	< 80% to 77%	< 77% to 74%	< 74% to 70%	< 70% to 67%	< 67% to 64%	< 64% to 61%	< 61% to 0%

### *Office Hours*

I encourage you to meet with me to discuss course material, any concerns you may have about your progress in this class, or strategies for effective studying and writing. My office is a gun free space (see Weapons Policy below). UT-Austin policy (HOP 8-1060, VII-C) requires me to give oral notice of my prohibition on concealed handguns in my office. For this reason, my door will remain closed during office hours so that I can provide notice to visitors before they enter. I recognize that this makes for an awkward situation. Nevertheless, please know that I welcome you into my office for free and open discussion; set aside your weapons in preparation.

If you wish to dispute a grade, be aware that re-grading may result in a lower score. Any student may email me to arrange for alternative accommodations.

#### *Writing Center and Your Course Specialist Consultant*

In the University Writing Center (UWC), consultants offer free, individualized, expert help with writing for any UT undergraduate by appointment. Your Course Specialist Consultant (CSC) is a special kind of UWC consultant who is dedicated to helping you and your classmates with writing in this particular course. You will have priority when scheduling consultations with your CSC in the UWC so long as you schedule consultations well in advance. Visit [uwc.utexas.edu/appointments](http://uwc.utexas.edu/appointments) and log into UT's new appointment-scheduling system, Symplicity. You can also call the UWC Front Desk at 512-471-6222. If you call the UWC Front Desk, be sure to give the name of your CSC. Please schedule consultations with your CSC only in regard to writing assignments for this class. For consultations about writing projects outside this class, schedule consultations with other UWC consultants using the same system outlined above. If your CSC will not be available when you want an appointment, ask them or the Front Desk to recommend other UWC consultants. The UWC is located in the [PCL Learning Commons](#).

#### *Documented Disability Accommodations*

Any student with a documented disability who requires academic accommodations should contact [Services for Students with Disabilities](#) (SSD) at 512-471-6259 (voice) or 1-866-329-3986 (video phone). Faculty are not required to provide accommodations without an official SSD accommodation letter.

#### *Attendance*

Regular class attendance is imperative to success in this course (see "Participation" above). It is your responsibility to sign the attendance sheet when you enter class. You are allowed two unexcused days of absence without penalty. Each additional absence will reduce your Participation by half a grade (5%). UT Austin policy requires you to notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class or assignment in order to observe a religious holy day, I will give you an opportunity to complete the missed work within a reasonable time after the absence. If you miss an in-class writing assignment for an official UT extracurricular activity, documented illness, or emergency, it may qualify as an excused absence, and you should discuss with me the possibility of making up the assignment at my office hours. If you miss a lecture or class activity, borrow notes from a classmate. Although I am happy to discuss course material with you at my office hours, there is no way to make up a lecture or class activity.

#### *Electronic Devices*

In order to be fully attentive in class and avoid distracting your classmates, put away your phone (turn off or set to silent) and other electronic devices unless their use is an explicit part of a class activity. Using a laptop (with wifi disabled) or an e-reader (but not a phone) to take notes and view assigned pdfs is permitted. Nevertheless, I strongly encourage you to make the investment in printing the readings and taking notes by hand. If you abuse your privilege to use electronic devices you will no longer be permitted to use them in our classroom. Audio or video recording in class is not permitted without an SSD accommodation and prior approval.

### *Weapons Policy*

With the exception of concealed handguns, no weapons may be brought into the classroom. Course participants with a license to carry a handgun must keep it concealed and on their person at all times. If a gun or any other weapon becomes visible, the person who sees the weapon should leave the classroom and call 911 so that law enforcement personnel can take appropriate action.

Handguns may not be brought to the classroom in backpacks, bags, or purses. Course participants may be called upon at unpredictable times to move about the room, go to the front of the room and participate in a presentation, or otherwise be separated from their belongings. University policy and the implementation of the law would be violated by the separation of the gun owner from their weapon that would result from these required classroom activities.

No weapons of any kind may be brought into the professor's office. Course participants will be given oral notice excluding handguns from my office and will sign a statement acknowledging this notification.

If you have concerns, comments, or questions about UT's effort to comply with S.B. 11, I encourage you to email those in charge of implementation: [campuscarry.utexas.edu](mailto:campuscarry.utexas.edu) (bottom-right of page).

### *Behavior Concerns Advice Line*

If you have concerns about the behavior or well-being of another member of the campus community, call [BCAL](http://www.bcal.utexas.edu) at 512-232-5050.

### *Academic Integrity*

Using the words and ideas of others without giving credit with an appropriate citation is plagiarism and a violation of the [University of Texas Honor Code](http://www.utexas.edu/honors). Whether accidental or intentional, plagiarism will result in a failure of the assignment and could lead to further disciplinary action. Before the first essay is due, complete the plagiarism tutorial and quiz available on our Canvas site to be sure you understand what plagiarism is and to minimize your risk of committing it. Please feel free to come talk to me about effective note-taking and citation strategies.

## **Course Schedule**

This syllabus represents my current plans. As we go through the semester, these plans may be adjusted to enhance class learning. I will communicate any such changes clearly in class and through Canvas. In addition, images, links and other resources not listed here may be posted on Canvas for your reference. Primary sources are marked (\*). Due dates marked below, including online submissions, are by the beginning of your (11am or 3pm) class period on that day.

### Part 1: Why History in the Science and Math Classroom?

#### **Week 1: Introductions and Guiding Questions**

*August 24* Read the syllabus and other first-day handouts.

*August 26* Rael, "[How to Read a Secondary Source](#)" and "[Some Keys to Good Reading](#)."  
Ede and Cormack, ix-63 (Introduction, Chapters 1 & 2).

May, Cindi. "[A Learning Secret](#)." Scientific American, June 3 2014.

"[The Cornell Note-Taking Method](#)," UT History Lab.

## **Week 2: Textbook Histories of Math and Science**

August 29 Field Trip: Meet at [PCL](#), [Learning Lab 4](#)

Matthews, Michael R. [Chapters 1 and 6 in Science Teaching: The Role of History and Philosophy of Science](#). Routledge, 1994.

Discussion Section: Textbook Histories Lab

August 31 **Short Essay 1 Due**

September 2

## **Week 3: Math's Big Picture**

September 5 Labor Day: No Class Meetings

September 7 Berlinghoff, William P., and Fernando Q. Gouvêa. "[History in the mathematics classroom](#)" and "[The history of mathematics in a large nutshell](#)." In [Math Through the Ages: A Gentle History for Teachers and Others](#), 1-62. Farmington, ME: Oxton House/Mathematical Association of America, 2015.

September 9 **Short Essay 2 Due**

Swetz, Frank J. "Pantas' Cabinet of Mathematical Wonders" *Convergence*. [www.maa.org/press/periodicals/convergence/pantas-cabinet-of-mathematical-wonders-images-and-the-history-of-mathematics](http://www.maa.org/press/periodicals/convergence/pantas-cabinet-of-mathematical-wonders-images-and-the-history-of-mathematics). Click through to read entire article.

## Part 2: Methods and Reasoning in Science and Mathematics

## **Week 4: How Do We Know What We Know?**

September 12 Ede and Cormack, 65-127 (Chapters 3 & 4).

Rael, "[How to Read a Primary Source](#)"

\*Galileo. [Selections from "Letter to the Grand Duchess Christina" \(1615\)](#).

Discussion Section: Primary Source Lab

September 14

September 16 Ede and Cormack, 129-135.

\* Bacon, Francis. [Selections from The New Organon or: True Directions Concerning the Interpretation of Nature \(1620\)](#), from the version presented at [www.earlymoderntexts.com](http://www.earlymoderntexts.com).

\*Descartes, René. [Parts 1, 2, 4. In Discourse on the Method of Rightly Conducting one's Reason and Seeking Truth in the Sciences \(1637\)](#), from the version presented at [www.earlymoderntexts.com](http://www.earlymoderntexts.com).

## Week 5: Facts, Experiments, Laws

September 19 Ede and Cormack, 135-152.

\*Newton, Isaac. ["A letter to the Royal Society presenting A new theory of light and colours" \(1671\)](http://www.earlymoderntexts.com/view/texts/normalized/NATP00006), in the version presented at [www.earlymoderntexts.com](http://www.earlymoderntexts.com). Also view the diagrams in the original at [www.newtonproject.sussex.ac.uk/view/texts/normalized/NATP00006](http://www.newtonproject.sussex.ac.uk/view/texts/normalized/NATP00006).)

*Discussion Section:* Light and Colors Lab: A Historical Experiment

September 21 Ede and Cormack, 152-163.

September 23 Ede and Cormack, 165-182.

## Week 6: Finding Order in Nature

September 26 Ede and Cormack, 182-206.

*Discussion Section:* **Bring Essay 3 topic or title, draft first paragraph, and bibliography;** begin sign-up for Lesson Plan Project groups and topics in class.

September 28 Ede and Cormack, 207-211.

September 30 Field trip: Meet at the [Harry Ransom Center \(HRC\)](#) (2nd floor waiting area)

**Short Essay 3 Due**

**5E Lesson Plan: Group & Topic Sign-up Due**

## Week 7: "One long argument"

October 3 Ede and Cormack, 212-217.

*Discussion Section:* **Bring Draft LP Proposal and Annotated Bibliography**

October 5 \* Darwin, Charles. ["Contents" and "Recapitulation and Conclusion." In On the Origin of Species, 1st ed, v-ix, 459-490.](#) London: John Murray, 1859.

October 7 Field trip: Meet at the [Texas Memorial Museum](#)

## Part 3: Math, Science, and Society

## Week 8: Brave New Worlds

October 10 Ede and Cormack, 217-278.

**5E Lesson Plan: Proposal and Annotated Bibliography Due**

*Discussion Section:* **Bring Draft "Engagement" Section**

**(October 11 is the last day you can register to vote in Texas! Make sure you're registered: [www.votetexas.gov](http://www.votetexas.gov))**

October 12 Ede and Cormack, 278-283.

\*Davenport, Charles Benedict. [Selections from Heredity in Relation to Eugenics.](#) New York: H. Holt and Company, 1911.

October 14 **5E Lesson Plan: "Engagement" Section Due**



Shapiro, Adam R. "[Civic Biology and the Origin of the School Antievolution Movement](#)." *Journal of the History of Biology* 41, no. 3 (2008): 409–433.

\*Hunter, George W. *A Civic Biology: Presented in Problems*. New York: American Book Company, 1914: [archive.org/details/civicbiologypres00huntrich](#). Skim the book, examining its organization and coverage of evolution (see especially pages 192-196).

Listen to "Episode 65: Darwinism and the Scopes "Monkey Trial," *Not Even Past*: [15minutehistory.org/2015/03/05/episode-65-darwinism-and-the-scopes-monkey-trial](#).

### Week 9: A Textbook Case

October 17 \*Mock trial documents.

*Discussion Section:* **Bring Draft "Exploration" and "Explanation" Sections**

October 19 \*Mock trial documents.

October 21 **5E Lesson Plan: "Exploration" and "Explanation" Sections Due**

Ede and Cormack, 284-315.

\*Oppenheimer, J. Robert "[Speech to the Association of Los Alamos Scientists" \(1945\)](#).

### Week 10: Politics and Controversies in Post-WWII Math, Science, and Education

October 24 Ede and Cormack, 332-340, 347-348.

Phillips, Christopher J. "[In Accordance With a "More Majestic Order': The New Math and the Nature of Mathematics at Midcentury](#)." *Isis* 105, no. 3 (2014): 540–563.

*Discussion Section:* **Bring Draft "Elaboration" and "Evaluation" Sections**

**(Early voting takes place October 24 - November 4: Go Vote!)**

October 26 Ede and Cormack, 315-321.

October 28 **5E Lesson Plan: "Elaboration" and "Evaluation" Sections Due**

Igo, Sarah E. "[The Majority Talks Back](#)." In *The Averaged American: Surveys, Citizens, and the Making of a Mass Public, 150-190*. Cambridge, MA.: Harvard University Press, 2007.

Listen to "Polling & Democracy: An Uneasy Relationship," *On The Media*: [www.wnyc.org/story/polling-democracy-uneasy-relationship2](#). You can begin at 1:29 minutes in.

### Week 11: 5E Lesson Plan Presentations

October 31 Group 1 Presents

*Discussion Section:* TBA

November 2 Group 2 Presents

November 4 Group 3 Presents

**Week 12: 5E Lesson Plan Presentations**

November 7 Group 4 Presents

Discussion Section: **Bring draft Final Essay thesis statement**

**(November 8 is Election Day: Go Vote!)**

November 9 Group 5 Presents

November 11 Group 6 Presents

**Week 13: 5E Lesson Plan Presentations**

November 14 Group 7 Presents

Discussion Section: **Bring draft Final Essay outline and bibliography**

November 16 Group 8 Presents

November 18 Group 9 Presents

**Week 14: 5E Lesson Plan Presentations**

November 21 Group 10 Presents

Discussion Section: TBA

November 23-25

**Thanksgiving Break: No Class Meetings**

**Week 15: Changing Science on a Changing Planet**

November 28 Ede and Cormack, 349-377.

\*Carson, Rachel. [Selections from Silent Spring, 1-13, 85-100](#). Boston: Houghton Mifflin, 1962.

Stoll, Mark. "Rachel Carson's Silent Spring, A Book that Changed the World." *Environment and Society Portal*. 2012. [www.environmentandsociety.org/exhibitions/silent-spring](http://www.environmentandsociety.org/exhibitions/silent-spring). Browse the site.

Discussion Section: TBA

November 30 Ede and Cormack, 323-329.

McPhee, John. [Selections from In Suspect Terrain](#). Macmillan, 1983.

December 2 Ede and Cormack, 379-396.

Weart, Spencer. Selections from The Discovery of Global Warming. [www.aip.org/history/climate/index.htm](http://www.aip.org/history/climate/index.htm) See links on Canvas C/R.

**Week 16: Contemporary Debates, Historical Perspectives**

December 5 Read and share a news article or blog about a current issue in science, math, or STEM education that could be illuminated by a historical perspective.

**Final Essay Due**

**Last day to submit an extra credit essay**

Discussion Section: TBA