Perspectives on Science and Math

UTeach
HIS 329U—Spring 2015

PAI 4.18
Lecture: MWF 11-12pm or MWF 2-3pm
Discussion Sections: M 12-1pm, M 3-4pm, W 12-1pm, W 3-4pm

Instructor:	Dr. Megan Raby	TA:	Daniel Jean-Jacques
	meganraby@austin.utexas.edu		*daniel.jean-jacques@hotmail.com*
	512-475-7925		
Office Hours:	GAR 0.114	Office Hours:	BEL 212N
	MW 4:00-5:00pm		M 4:30-6:30pm
	and by appointment		and by appointment

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/core/flags/writing*.

Readings:

One required textbook is available for purchase at the Co-op:

> 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. *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%
Research Essay: "Textbook Histories"	25%
Annotated Bibliography and Topic Proposal (5%)	
Essay (averaged with grade for draft) (20%)	
5E Lesson Plan Project (group project, graded individually)	40%
Annotated Bibliography and Topic Proposal (5%)	
Presentation of 5E Lesson (10%)	
5E Lesson Plan (averaged with grade for draft) (25%)	

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).

Reading Comprehension/Reflection 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.

Research Essay

A major writing project of this course is a 6-8 page essay examining the use of history in middle and high school science and math textbooks. You will research the deeper history behind a historical case covered in a selection of textbooks and make an argument about its role in pedagogy.

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 historical material and perspectives to enhance the teaching of a science or math concept, the nature of science, or reasoning in mathematics.

Grading System

F	D-	D	D+	C-	C	C+	B-	B	B+	A-	A
0-59	60-63	64-66	67-69	70-73	74-76	77-79	80-83	84-86	87-89	90-93	94-100

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. If problems arise, either academic or personal, that might jeopardize your performance in this course, you must inform me of the problem by the next available office hour. If you wish to dispute a grade, be aware that re-grading may result in a lower score.

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 one unexcused absence without penalty. Each additional absence will reduce your Participation by a half-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 a University extracurricular activity, 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.

Distractions

In order to be fully attentive in class and avoid distracting your classmates, refrain from using electronic devices during class for purposes other than accessing assigned course material. If you abuse them, you will lose your privilege to use such devices in our classroom. Using e-readers or a laptop (not a phone) to view assigned pdfs is permitted, but I strongly encourage making the investment in printing the readings. Turn your phone off and disable wifi unless accessing the internet is part of a class activity.

Writing Center

The Undergraduate Writing Center, located in the FAC 211, phone 471-6222, *http://uwc.utexas.edu* offers individualized assistance to students who want to improve their writing skills. There is no charge, and students may come in on a drop-in or appointment basis.

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. 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 (*). All due dates marked below, including online submissions, are for the beginning of your (11am or 2pm) class period on that day.

Part 1: Why history in the science and math classroom?

Week 1: Introductions and Guiding Questions

January 21

January 23   Rael, "How to Read a Secondary Source" and "Some Keys to Good Reading."

Ede and Cormack, ix-27, 32-37 *(The rest of Chapter 2 is optional.)*

Part 2: Methods and Reasoning in Science and Mathematics

Week 2: Math and the Real World

January 26   Matthews, Michael R. Chapters 1 and 6 in *Science Teaching: The Role of History and Philosophy of Science*. Routledge, 1994.

January 28

January 30   Ede and Cormack, 65-90.

Discussion Section   5E Lesson Plan Research Lab

Week 3: How Do We Know?

February 2   Ede and Cormack, 91-127.

For your Discussion Section meeting read:

Rael, "How to Read a Primary Source."

*Galileo. Selections from "Letter to the Grand Duchess Christina" (1615).

February 4

February 6   Ede and Cormack, 129-135.

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

*Descartes, René. Part*s 1, 2, 4. In *Discourse on the Method of Rightly Conducting one's Reason and Seeking Truth in the Sciences* (1637) in the version presented at *www.earlymoderntexts.com*.

Discussion Section   Primary Source Lab

Week 4: Facts, Experiments, Laws

February 9   Ede and Cormack, 135-152.

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

February 11   **Lesson Plan: Annotated Bibliography and Topic Proposal**

Ede and Cormack, 152-163.

February 13   Ede and Cormack, 165-182.

Discussion Section   Lab: An Experiment with Light and Colors

Week 5: Finding Order in Nature

February 16   Ede and Cormack, 182-206.

February 18   Fieldtrip: Ransom Center

February 20   Ede and Cormack, 207-211.

Discussion Section   Peer Reviewing 5E Lesson Plan Proposals

Week 6: "One long argument"

February 23   Ede and Cormack, 212-217.

February 25   * Darwin, Charles. "Contents" and "Recapitulation and Conclusion." In *On the Origin of Species*, 1st ed, v-ix, 459-490. London: John Murray, 1859.

February 27   Fieldtrip: Texas Memorial Museum

Discussion Section   Workshopping 5E Lesson Plan Drafts

Part 3: Math, Science, and Society

Week 7: Brave New Worlds

March 2   Ede and Cormack, 217-227.

March 4   Ede and Cormack, 241-278.

March 6   Ede and Cormack, 278-283.

   *Davenport, Charles Benedict. Selections from *Heredity in Relation to Eugenics.* New York: H. Holt and Company, 1911.

Discussion Section   Workshopping 5E Lesson Plan Drafts

Week 8: A Textbook Case

March 9   **5E Lesson Plan Draft 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.

   *"Excerpts from Hunter's *Civic Biology* (1914)." *Famous Trials in American History: Scopes "Monkey" Trial (1925).* http://law2.umkc.edu/faculty/projects/ftrials/scopes/hunt192.htm.

March 11   *Edwards v. Aguillard documents.

March 13

Discussion Section   Preparation for Edwards v. Aguillard/Discuss 5E Lesson Plan Drafts

Week 9: Spring Break!

Week 10: Science During Wartime

March 23

March 25   Ede and Cormack, 284-315.

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

March 27   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   "Textbook Histories" Research Lab

Week 11: DNA and Destiny

March 30   Rael, "The Thesis."

   Ede and Cormack, 315-321, 349-377.

April 1   **Lesson Plan Presentation 1**

April 3   **Lesson Plan Presentation 2**

Discussion Section   Peer Reviewing Essay Proposals and Thesis Statement Lab

Essay: Annotated Bibliography and Topic Proposal Due *(In Discussion)*

Week 12: Better Living Through Chemistry?

April 6   Rael, "Structuring Your Essay" and "The Three Parts of a History Paper."

*Carson, Rachel. *Silent Spring*, 1-13, 85-100. Boston: Houghton Mifflin, 1962.

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

April 8   **Lesson Plan Presentation 3**

April 10   **Lesson Plan Presentation 4**

Discussion Section   Outlining Lab

Week 13: Choice and Chance

April 13   TBA

April 15   **Lesson Plan Presentation 5**

April 17   **Lesson Plan Presentation 6**

Discussion Section

Week 14: Geological Revolutions

April 20   Ede and Cormack, 323-329.

McPhee, John. Selections from *In Suspect Terrain.* Macmillan, 1983.

April 22   **Lesson Plan Presentation 7**

April 24   **Lesson Plan Presentation 8**

Discussion Section

Week 15: Changing Climates of Opinion

April 27   **Essay Draft Due**

Weart, Spencer R. "Discovering a Possibility" and "A Delicate System." In *The Discovery of Global Warming*, 20-65. Harvard University Press, 2008.

April 29   **Lesson Plan Presentation 9**

May 1   **Lesson Plan Presentation 10**

Peer Reviews of Essay Due

Discussion Section

Week 16: Contemporary Debates, Historical Perspectives

May 4   Wilson, Edward O., and Edward Frenkel. "Two Views: How Much Math Do Scientists Need?" *Notices of the American Mathematical Society* 60, no. 7 (2013): 837-838.

May 6   TBA

May 8   **5E Lesson Plan Revision Due**

Discussion Section

Exam Week: **Essay Revision Due by the end of you your scheduled exam period.**

MWF 11-12pm lecture: **Wednesday, May 13, 9:00-12:00 noon**.

MWF 2-3pm lecture: **Saturday, May 16, 9:00-12:00 noon.**