

Perspectives on Science and Math

UTeach HIS 329U—Spring 2014

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

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TA: Angela Smith angelasmith@utexas.edu Office Hours: Prufrock's Cafe in PCL M 1-3pm, W 1-2pm 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 upperdivision 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 the benefits and expectations of Writing Flag courses, see *http://www.utexas.edu/ugs/core/flags/writing*. I also encourage you to take advantage of the resources provided by the Undergraduate Writing Center (*http://uwc.utexas.edu*).

Readings:

Two required textbooks are available for purchase at the Co-op:

Berlinghoff, William P., and Fernando Q. Gouvêa. *Math Through the Ages: A Gentle History for Teachers and Others*. Expanded ed. Washington, DC: The Mathematical Association of America and Oxton House Publishing, 2004.

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 primary and secondary sources 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		10%
Reading Comprehension/Reflection Questions		15%
Essay 1: Method, Innovation, Argumentation		15%
Essay 2: Textbook Histories (Research Paper)		25%
Annotated Bibliography and Topic Proposal	5%	
Essay 2	20%	
Lesson Plan (Group Project)		35%
Annotated Bibliography and Topic Proposal	5%	
5E Lesson Plan Presentation	10%	
5E Lesson Plan	20%	

Grading criteria for essays and lesson plans are attached at the end of the syllabus. I encourage you to meet with me or your TA to discuss any concerns you may have about course material, your progress in this class, and strategies for effective studying and writing. If you wish to dispute a grade, be aware that re-grading may result in a lower grade. If problems arise, either academic or personal, that might jeopardize your performance in this course, you must try to inform me of the problem at the next available office hour.

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 accommodation letter from SSD.

Attendance

You are allowed one unexcused absence without penalty. If you must miss a class for an excused extracurricular activity, illness, or emergency, contact me as soon as possible and consider attending my office hours or meeting with your TA. 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.

Late Assignments

Late reading comprehension/reflection assignments will not be accepted. Except under extreme circumstances that you negotiate with me at least one week in advance, essays and lesson plan assignments will have one half-grade (5 percentage points) deducted for each day late.

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 or your TA about how to avoid plagiarism.

Expectations:

Participation

Our classroom is a forum for coming to new, shared understandings of course material. We will not simply reiterate information covered in our readings. Our goal is to build an intellectual community that will enrich your understanding and engagement with the content of the course. I understand that speaking in class is more difficult for some students than for others. With practice, however, joining in the conversation becomes easier.

Preparation

The quality of our conversations depends on you to actively read assigned material in preparation for class meetings. I expect you to engage with the readings and take notes to aid participation in class. See the assigned Rael text for tips on active reading. Readings are due on the day they are listed on the course schedule. <u>Always bring your notes and the course materials assigned for the day to class with you</u>. Without this material, you are not prepared for class. Also, when budgeting your time, please keep in mind that daily reading assignments vary in length and that additional research and reading is required for Essay 2 and your 5E Lesson Plan. A good rule of thumb is to set aside 2-3 hours of study time for each hour spent in class. You are welcome to visit office hours to discuss effective reading and note-taking strategies.

Respect

We will encounter controversial material in this class. Your contributions to discussion should be respectful and supported with evidence, but disagreement is strongly encouraged. Both as students and as future teachers, you are part of a diverse learning community; one of our primary goals is to learn how to understand differing perspectives and critically evaluate opposing viewpoints. I ask that you join with me in making the classroom a space where individuals of all backgrounds can feel welcome to take part in rigorous intellectual conversation.

In order to be fully attentive in class and avoid distracting your classmates, <u>I also ask that</u> <u>you refrain from using electronic devices during class for purposes other than accessing</u> <u>assigned course material.</u> If you are found to be doing so, you may lose your priviledge to use such devices in our classroom. Using e-readers or your laptop to view pdfs is permitted, but I prefer that you print readings and take notes on paper. Turn your phone off and disable wifi on your laptop unless I explicitly state that accessing the internet is part of a class activity. Looking material up or sharing ideas online is encouraged after class. If a classmate's use of electronic devices or other behavior becomes distracting to you, politely inform her or him of the problem or bring it to my attention after class.



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 and other resources not listed here will be posted on Canvas for most weeks. Unless they are marked as "extras" in Canvas, you should be prepared to discuss them in class. Primary sources are marked (*). Consider all due dates, even for assignments submitted online, to be by the opening of *your* class period on that day (11am or 2pm).

Week 1: Introductions and Guiding Questions

January 13 Why history?

January 15 What is science? What is math? Davis, Philip J., and Reuben Hersh "Confessions of a Prep School Math Teacher." In *The Mathematical Experience*, 272-274. New York: Houghton Mifflin, 1998).

January 17 How do we know? Ede and Cormack, 14-21, 32-37.

Berlinghoff and Gouvêa, vii-viii, 1-34.

Week 2: Revolutions

January 20: Martin Luther King Jr. Day-<u>No Class</u>

January 22: "And yet it moves" Ede and Cormack, 91-127.

Berlinghoff and Gouvêa, 35-42.

January 24: Scientific Methods

* Bacon, Francis. Preface and Aphorisms 1-52, 61-62, 67-68, 80-85. In *The New Organon* (1620), 1-11, 13-14, 18, 25-17, in the version presented at *www.earlymoderntexts.com*.

*Descartes, René. Parts 1-4. In *Discourse on Method* (1637), 1-18, in the version presented at <u>www.earlymoderntexts.com</u>.

Berlinghoff and Gouvêa, 73-76 (Sketch 2), 113-118 (Sketch 8).

Ede and Cormack, 129-135.

Week 3: Laws of Nature

January 27: The Year of Wonders

Berlinghoff and Gouvêa, 169-174 (Sketch 16).

Ede and Cormack, 135-152.

January 29: The Secret Newton

*Selections from Issac Newton's writings on "The Newton Project," www.newtonproject.sussex.ac.uk.

Ede and Cormack, 152-162.

January 31: The Newtonians

Due: Annotated Bibliography and Topic Proposal for 5E Lesson Plan

Berlinghoff and Gouvêa, 42-47.

Ede and Cormack, 165-174.

Week 4: Ordering the World

February 3: Measuring Up Berlinghoff and Gouvêa, 47-53.

Ede and Cormack, 174-182.

February 5: Collecting and Classifying Ede and Cormack, 182-206.

February 7: Space, Time, and the Earth Ede and Cormack, 207-211.

Week 5: Global Knowledge

February 10: Biogeography Lab

February 12: Voyages Ede and Cormack, 212-217.

February 14: "One long argument"

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

Week 6: Arguing Origins

February 17: The Reception of Darwin's Theory Ede and Cormack, 217-227.

> Numbers, Ron. "Historical Perspectives on Creationism." *Counterbalance Interactive Library*. <u>http://www.counterbalance.net/history/intro-frame.html</u>. Due: Essay 1

February 19: 5E Lesson Plan Presentation 1

February 21: 5E Lesson Plan Presentation 2

Week 7: Trials, Tribulations, and Textbooks

February 24: Don't Mess with Textbooks

Shapiro, Adam R. "Civic Biology and the Origin of the Antievolution Movement." In *Trying Biology: The Scopes Trial, Textbooks, and the Antievolution Movement in American Schools*, 62-86. Chicago: University of Chicago Press, 2013.

*"Excerpts from Hunter's *Civic Biology* (1914)." *Famous Trials in American History:* Scopes "Monkey" Trial (1925). <u>http://law2.umkc.edu/faculty/projects/ftrials/scopes/</u> <u>hunt192.htm</u>. *February 26: A Textbook Case* *Primary sources TBA.

February 28: 5E Lesson Plan Presentation 3

Week 8: Mid-term Reflections

March 3: <u>5E Lesson Plan Presentation 4</u> Ede and Cormack, 227-240.

March 5: 5E Lesson Plan Presentation 5

March 7: The Story of 1

Week 9: Enjoy your Spring Break!

March 10-14—<u>No Class</u>

Week 10: Hidden Realities

March 17: Mysterious Rays Ede and Cormack, 241-278.

March 19: Counterintuitive Worlds

Due: Annotated Bibliography and Topic Proposal for Essay 2

Einstein, Albert. "What is the Theory of Relativity? (1919)." In *The Collected Papers of Albert Einstein*, Translation Volume 7. Princeton: Princeton University Press, 2002.

Berlinghoff and Gouvêa, 193-198 (Sketch 19).

March 21: 5E Lesson Plan Presentation 6

Week 11: The Measure of Man?

March 24: Genetics and Eugenics Ede and Cormack, 278-283.

March 26: The Averaged American

Igo, Sarah E. "Middletown Becomes Everytown." In *The Averaged American: Surveys, Citizens, and the Making of a Mass Public*, 68-102. Cambridge, MA: Harvard University Press, 2007.

March 28: 5E Lesson Plan Presentation 7

Week 12: Science, Math, and Democracy

March 31: Science During Wartime Ede and Cormack, 284-315.

April 2: Cold War in the Classroom Ede and Cormack, (330-348 is optional) 349-366.

April 4: 5E Lesson Plan Presentation 8

Week 13: Reductionism and Complexity

April 7: Discovering the Double Helix Ede and Cormack, 315-321, 366-377.

April 9: Better Living Through Chemistry?

*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. <u>http://www.environmentandsociety.org/exhibitions/silent-spring/overview</u>.

April 11: 5E Lesson Plan Presentation 9

Week 14: Choices

April 14: Let's Make a Deal

Due: Essay 2

Berlinghoff and Gouvêa, 207-212 (Sketch 21), 215-220 (Sketch 22).

April 16: The Earth Moves, Again Ede and Cormack, 323-329.

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

April 18: 5E Lesson Plan Presentation 10

Week 15: Getting Warmer...

April 21: Changing Climates of Opinion

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

April 23: 5E Lesson Plan Presentation 11

April 25: 5E Lesson Plan Presentation 12

Week 16: End of Semester Reflections

April 28: Synthesis

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.

April 30: Past and Future

Berlinghoff and Gouvêa, 53-60.

Ede and Cormack, 379-396.

May 2: Science, Math, and History in Perspective <u>Due: Optional Revision of Essay 2</u> <u>Due: Final Day to Hand in 5E Lesson Plan</u>