Perspectives on Science and Math-UTeach

HIS 329U – 39275, 39280, 39285, 39290
Lectures: MWF 11:00 – 12:00, 2:00 – 3:00; 4.18 Painter Hall
Discussion sections: M 12:00 – 1:00; M 3:00 – 4:00; W 12:00 – 1:00; W 3:00 – 4:00

Instructor: Perrin Selcer
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Office Hours: M 10-11; WF 1-2 or by app.

History TA: Kelly Ferneding
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Office Hours: M 3:30-4:30, W 1:30-2:20
Office hours meet next to Starbucks in SAC

UTeach Intern: Julia Eaddy
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Course Description

Perspectives on Science and Math explores the intellectual, social, and cultural history of science and math from the Renaissance to the present. It is designed for students in UTeach Natural Sciences. The course has three interlocking goals: to give you an overview of the history of science and mathematics, for your general education and to help you reflect on your own reasons and goals for teaching science or math; to enable you to put this broader history and context to work in science and mathematics pedagogy; to improve your communication, research and information analysis skills.

The readings and lessons explore the why, how, and what of the history of science and math. We will attempt to identify and analyze the goals of natural philosophers, scientists, and mathematicians—why did they think the knowledge they made was important? We will investigate the practices by which people have established the *credibility* or *authority* of knowledge—how did people agree on what was true? And we will study the content of theories—what did people know? "We" is not a figure of speech here. This is a team taught class, and you are on the team. Nearly a third of the lessons will be developed and led by students.

This is a writing flag class. Writing Flag courses are designed to give students experience with writing in an academic discipline. In this class, you can expect to write regularly during the semester, complete substantial writing projects, and receive feedback from your instructor to help you improve your writing. You will also have the opportunity to revise one or more assignments, and to read and discuss your peers' work. A substantial portion of your grade will be based on your written work. You are encouraged to take advantage of the resources provided by the Undergraduate Writing Center: http://www.uwc.utexas.edu.

Grading Policies

Attendance will be factored into your grade. Perfect attendance will earn you a bonus 2% of your total grade. Up to 3 absences will not affect your grade. Each absence over 3 will result in a 2% deduction from your final grade. Exceptions to this policy due to major health or other life complications must be worked out with Dr. Selcer as soon as the problem emerges.

Unless an extension is granted well in advance, the grade will drop a third of a letter for each day an assignment is late. Reading comprehension questions will not be accepted late.

Plus/minus grades will be assigned.

Students with disabilities may request appropriate academic accommodations from Services for Students with Disabilities: 471-6259.

University policies on plagiarism and academic dishonesty will be strictly enforced.

Assignments

Participation: 15%

Active and insightful engagement will be rewarded. Everyone is expected to participate in discussions and in small group activities. Attendance is not part of the participation grade (see attendance policy above). Participation in discussion sections and peer editing will be included.

Reading Comprehension Questions: 10%

These are plus-check-minus assignments and are designed to improve comprehension and assure that you have completed the reading. All readings will be posted on Blackboard.

Unit Reflections: 30% (10% each—last reflection counts as the final)

Three to five page written reflections on the readings, lectures, and discussions.

Lesson Plan: 45%

Annotated Bibliography: 5%

A bibliography containing at least five quality sources on the topic of your lesson plan. Each entry must include a paragraph summarizing the content of the source and explaining its importance.

5E Lesson Plan: 25%

Working in pairs, you will prepare and revise one 5E Lesson Plan integrating a historical topic into a science or math lesson. These lessons are considered part of the class, and should focus on an interesting or important historical event, idea or method. The 5E Lesson Plans will be critical for providing the intellectual history component of the course—i.e. *what* scientists and mathematicians knew. Handouts, examples, assessment lists, etc. will explain the assignment and establish clear expectations.

5E Lesson Plan Presentation: 15%

With your lesson plan partner, you will give a 10 to 15 minute lecture on the historical topic of your lesson plan and present your 5E Lesson Plan to the class. The class will provide constructive feedback to help with your revision.

Week 1: Introduction
Aug. 29: Who Cares about History?

Aug. 31: Who Cares about Science or Math?
Andrew Hacker, "Is Algebra Necessary," *New York Times* (28 July 2012)

Unit One: The Word and the World

Week 2: Other Worlds
Sep. 3: Labor Day

Sep. 5: Knowledge and Utopia
Reading: Provide translation of excerpt from Chapter 7 of Plato *The Republic* (the entire chapter can be read at http://classics.mit.edu/Plato/republic.html)

Sep. 7: Library Tutorial in PCL 1.339 with Janelle Hedstrom
Begin researching 5E Lesson Plan

Week 3: Challenging Authority
Jan. 10: 5E Lesson Plan demonstration

Sep. 12: Natural Philosophy vs. Alchemy

Sep 14: Vesalius: Know Thyself
Reading: Preface and browse images in *De Fabrica* (http://vesalius.northwestern.edu)

Week 4: "The Scientific Revolution?"
Sep 17: Copernicus: The Structure of Scientific Revolutions
Reading: Begin reading for Sep. 19th

Sep. 19: Galileo: Theology, Philosophy, Science
Reading: Stillman Drake, *Galileo* (1980), 1-8, 38-72.

Sep 21: Theory vs. Practice
Katherine Hill, "Juglers of Schollers"? Negotiating the Role of a Mathematical Practioner," *BJHS* (Sep. 1998), 253-274.

Week 5: The Enlightenment
Annotated Bibliographies due in discussion sections
Sep. 24: Asking Nature
Bacon, excerpts from *The New Organon*

Sep 26: The Encyclopédie
Reading: Map of the System of Human Knowledge; Detailed explanation of the System of Human Knowledge; 3 articles from the Encyclopédie
(http://quod.lib.umich.edu/d/did/index.html)

Sep. 28: The Clockwork Universe?
Reading: Richard G. Olson, "Newton's Religion, Newtonian Religions, and Eighteenth-Century Reactions," *in Science and Religion, 1450-1900* (Westport Conn.: Greenwood Guides to Science and Religion, 2004), 111-131.

Unit Two: Evolution

Week 6: Ordering Diversity
First Draft of Unit One Reflection due in discussion section
Oct. 1: What Is a Species?

Oct. 3: Natural Theology
Reading, Paley, *Natural Theology*, chapters 1-3 (http://darwin-online.org.uk/ [search: paley natural theology])

Oct. 5: The Dismal Science
Thomas Malthus, *An Essay on the Principle of Population* (London, 1798), Chapters 1

Week 7: The Struggle for Existence
Final Draft of Unit One Reflection Due in Section
Oct. 8: Nature Red in Tooth and Claw
Charles Darwin, *The Origin of Species,* Ch. 3

Oct. 10: 5E Lesson Plan 1

Oct. 12: 5E Lesson Plan 2

Week 8: Evolutionary Controversy
Oct. 15: 5E Lesson Plan 3

Oct. 17: 5E Lesson Plan 4

Oct. 19: The Scopes Trial
Ronald L. Numbers, "Introduction: Darwinism, Creationism, and Intelligent Design" and "The Scopes Trial: History and Legend" in *Darwinism Comes to America* (Cambridge, Mass.: Harvard University Press, 1998), 1-23, 76-92

Unit Three: The Strange History of the Bell Curve

Week 9: Statistics
Oct. 22: Social Physics and the Invention of the Normal Man
Reading: Alain Desrosières, "Quetelet, Adolphe," *Encyclopedia of Social Measurement*, (2005), 263-8

Oct. 24: Eugenics
Excerpt from Francis Galton, *Hereditary Genius* (1869)

Oct 26: 5 E Lesson Plan 5

Week 10: The Meaning of Biological Inequality
Oct. 29: The Progressive Era & the Intelligence Quotient
Reading: Lewis M. Terman, "The Problem," in *Intelligence Tests and School Reorganization* (1923), 1-31

Oct. 31: 5E Lesson Plans 6

Nov. 2: The Liberal Antiracist Orthodoxy
Reading: Unesco, *Statement on Race*

Week 11: Science and Inequality
Nov. 5: 5E Lesson Plan 7

Nov. 7: The Strange History of the Bell Curve
Reading: Excerpts from Richard J. Hernstein and Charles Murray, *The Bell Curve*, xxi-xxiii, 269-280, 311-315, 509-511, 523-526, 549-552 [25 pages total]
Stephen Jay Gould, "Critique of *The Bell Curve*," in *The Mismeasure of Man* (1996), 367-378

Nov. 9: Fisher vs. UT

Unit Four: Science and the Nation-State, or Science and the Common Good

Week 12: Improving Nature
First Draft of Unit Two/Three Reflection due in Section

Nov. 12: The Legacy of WWII
Reading: Responsibility of biologist reading.
Vannevar Bush, "Letter of Introduction and Summary of Report," *Science, the Endless Frontier* (1945)

Nov. 14: Science for Citizenship
Reading: Bentley Glass, "The Responsibilities of Biologists," AIBS Bulletin (Nov. 1957), 9-13
You may skip the section titled "Our Responsibilities to our Profession"

Nov. 16: 5E Lesson Plans 8

Week 13: War and Science
Final Draft of Unit Three Reflection Due in Section

Nov. 19: The Tragedy of the Commons
Reading: Garrett Hardin, "The Tragedy of the Commons," *Science* 162 (1968), 1243-1248;
Julian L. Simon, "Resources, Population, Environment: An Oversupply of False Bad News," *Science* (1980), 1431-1437

Nov. 21: **No class**

Nov. 23: 5E Lesson Plans 9

Week 14
Nov. 26: 5E Lesson Plan 10

Nov. 28: 5E Lesson Plans 11

Nov. 30: Democracy, Expertise and the Commons: Stakeholders Analysis

Week 15: Manipulating the Scientific Commons
Dec. 30: Government Regulation: Smoking Science
Reading: Naomi Oreskes & Erik M. Conway, "Doubt is Our Product," in *Merchants of Doubt*, 10-35

Dec. 5: Climate Change
Reading: Naomi Oreskes & Erik M. Conway, "Epilogue: A New View of Science," in *Merchants of Doubt*, 266-274

Dec. 7: Last Day Reflections

Final Exam for 11-12 class: Wed., Dec. 12, 7pm (Final Reflection due)
Final Exam for 2-3 class: Sat. Dec. 15, 2pm (Final Reflection due)