Dr. Benjamin Goldberg
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Time: TBD
Classroom: TBD

Office: CPR 369
Hours: TBD

Humanities 2594: Science in Cultural Context

This course is part of the University of South Florida's Foundations of Knowledge and Learning (FKL) Core Curriculum. It is certified for Humanities and for the following dimensions: Critical Thinking, Inquiry based learning, Human Historical Contexts and Processes, and Human and Cultural Diversity. Students enrolled in this course will be asked to participate in the USF General Education assessment effort. This might involve submitting copies of writing assignments for review, responding to surveys, or participating in other measurements designed to assess the FKL Core Curriculum learning outcomes.

Course Description

Science—howsoever we understand that term—is a dominant force in modern society, a source of authoritative knowledge about the world. It is therefore essential to understand how science works, its history and limits, as well as to imagine new modes of interaction between science and the culture in which it operates.

This course is designed to give humanities and cultural studies majors an introduction to science studies and the history and philosophy of science, in order to provide a deeper understanding of the complicated ways in which science and the cultures in which it is embedded interact and shape each other. It is also intended to provide a general education credit in humanities to enable students in science, technology, engineering, and medicine to fulfill their requirements by thinking historically and critically about the cultural contexts of scientific knowledge and its production.

This course is divided into two parts. The first part will concern the historical context of the development and construction of the very idea of science during the seventeenth and eighteenth centuries. In this section we shall explore not just the development of those practices we now label science, but the ways in which the work of historians and others looking back on this period played a part in constructing our current conception of science and it's place in society.

The second part shall build on the work done in the first by looking at these issues in the context of current scientific practices. Here we shall study both philosophical models of science used in discussions of science and culture, as well as the background assumptions and concepts upon which these models are built, as well as the way in which values affect scientific reasoning and practice. We shall focus our efforts in particular on the history of the science of gender differences, as this case study will provide an excellent opportunity to discuss and understand how science is affected by values and assumptions, and how society is, in turn, affected by the results of scientific work.

Objectives

- Students will be introduced to science studies, and the history and philosophy of science

- Students will encounter a wide range of texts considering the nature and meaning of science as it occurs in various cultural contexts, from early modern Europe to the high tech world of modern neuroscience
- Students will consider the place and role of gender, social status, and politics in the production of scientific knowledge
- Students will learn about the place of values in scientific practice and in the construction of scientific knowledge claims

Student Learning Outcomes

- Students will demonstrate the ability to carefully think and talk about the cultural context of scientific knowledge through class discussion and in-class group and individual projects
- Students will demonstrate the ability to read texts closely and critically, and to identify the appropriate cultural and historical contexts for analysis
- Students will be able to critically analyze the nature of science as it was constructed in the early modern period, and will demonstrate their skills by means of a paper examining the meaning of science in this period
- Students will be able to critically analyze the role of gender and social status in the production of scientific knowledge, and write a paper critically assessing their importance by developing a specific case study

Course Topics

- The history of science in early modern Europe
- The philosophy of science and science studies
- The role of gender in science, and the science of gender
- Cultural contexts and their influence on scientific knowledge production

Policies

1. Final Examinations Policy - all final examinations are to be scheduled in accordance with the University's final examination policy.
    - http://www.ugs.usf.edu/policy/FinalExams.pdf
2. General Attendance Policy
    - http://www.ugs.usf.edu/policy/GeneralAttendance.pdf
3. Early Notification Requirement for Observed Religious Days - Students who anticipate the necessity of being absent from class due to the observation of a major religious observance must provide notice of the date(s) to the instructor, in writing, at the beginning of the term.
    - http://www.ugs.usf.edu/policy/ReligiousDays.pdf
4. Academic Integrity of Students
    - http://www.ugs.usf.edu/policy/AcademicIntegrityOfStudents.pdf
5. Disruption of the Academic Process
    - http://www.ugs.usf.edu/policy/DisruptionOfAcademicProcess.pdf
6. Student Academic Grievance Procedures
    - http://www.ugs.usf.edu/policy/StudentAcademicGrievanceProcedures.pdf
7. Students with Disabilities - Students with disabilities are responsible for registering with Students with Disabilities Services (SDS) in order to receive academic accommodations. SDS encourages students to notify instructors of accommodation needs at least 5 business days prior to needing the accommodation. A letter from SDS must accompany this request.
    - See student responsibilities: http://www.sds.usf.edu

- See instructor responsibilities: http://www.asasd.usf.edu/instructorresponsibilities.asp?refer=FACULTY

8. University Emergency Policy
   - *In the event of an emergency, it may be necessary for USF to suspend normal operations. During this time, USF may opt to continue delivery of instruction through methods that include but are not limited to: Blackboard, Elluminate, Skype, and email messaging and/or an alternate schedule. It's the responsibility of the student to monitor Blackboard site for each class for course specific communication, and the main USF, College, and department websites, emails, and MoBull messages for important general information.*

Required Texts

- Shapin, Steven (1998), *The Scientific Revolution,* University of Chicago Press
- Fine, Cordelia (2010 (2011 reprint ed.)), *Delusions of Gender: How Our Minds, Society, and Neurosexism Create Difference*, WV Norton
- All other readings will be made available either online or in a reader.

Grades

100-93% A	<93-90% A-	<90-87% B+	<87-83.1% B	<83-80% B-
<80-77% C+	<77-73% C	<73-70% C-	<70-67% D+	<67-63% D
<63-60% D-	< 60% F			

Attendance and Participation (15%)

Attendance means showing up to class on time. Participation means coming to class prepared, with that day's readings completed, as well as taking part in class discussions and activities.

Midterm exam (12.5%)

Due during Week 6. This exam will be a short, in class exam made up of a multiple choice and short answer questions. It will cover the material from the Unit I.

Final exam (12.5%)

Due during finals week. This short exam will be made up of a multiple choice and short answer questions. The exam will not be cumulative: only material from Unit II will be covered.

PowerPoint (20%)

Due during week 10. Weeks 5 and 6 will cover Isaac Newton and the new physics he developed in the early modern period, focusing in particular on how knowledge was used in this time and place. Students will be asked to individually complete an assignment about this material. Students will be first asked to choose some issue or problem, whether it is moral, or social, or scientific (e.g., what is the best way to feed the hungry? Or, how could we make cars more efficient?), and then to answer the following questions using a PowerPoint:

- Ask: what questions did Newton ask? How did he come up with these questions? Why were they important? Now concerning the issue you have chosen: what questions about this issue are important to ask? What questions might be safely ignored?
- Investigate: how did Newton investigate these questions? Why did he choose to investigate them in

this way? Now concerning the issue you have chosen: how would you investigate this problem?
- Create: Newton responded to his questions by writing a book, the *Principia mathematica.* You will be asked instead to create a PowerPoint, introducing your issue, why you think it is important, and describing how you would go about investigating that issue.
- Discuss: You will be expected to turn in you PowerPoint presentations to be shared with the entire class through Canvas, and you must spend some time viewing you classmates' work.
- Reflect: Having looked over your peers' presentations, you must now reflect on your own. Are their questions you might ask now, or ask differently having seen these other examples? Would you choose another way to investigate your issue?

Writing Assignment for Unit 1 (20%)

Due week 7. The first writing assignment is a paper no longer than 5 pages. The task for this paper is to reflect on the meaning of science during the early modern period.

First, offer a definition of science **in this period**, making sure to pick out at least **three** important characteristics of scientific activity under your definition.
Second, support your definition with at least **two** examples from primary sources, showing how they fit your understanding of science.
Finally, in the last section, briefly compare your understanding of early modern science with modern scientific activity, discussing at least **one** difference and **one** similarity.

ALL STUDENTS MUST MEET WITH ME SOMETIME BEFORE THE PAPER IS DUE TO DISCUSS THEIR WORK.

Writing Assignment for Unit 2 (20%)

Due during finals week. The second writing assignment is a paper no longer than 5 pages. The task for this paper is to use the readings from the class to answer each of following questions. Remember to always use examples and quotes to support your arguments!

Question 1: Is science and/or rationality gendered? What could it mean to make such claims, and how could they be justified?
Question 2: What should a feminist conception of science look like? Can feminism make science *better*?
Question 3: Is the science of sexuality and gender epistemologically respectable? Why or why not?

ALL STUDENTS MUST SUBMIT AN OUTLINE OF THEIR PAPER ON WEEK 10, AS WELL AS MEET WITH ME BEFORE TURNING IN THEIR PAPER.

SCHEDULE

Unit I: The History of the Scientific Revolution

Week 1: What was known in early modernity? Part I

Read:

- Shapin, Chapter 1
- Galileo Galilei, *Letter on Sunspots* (1613), in *Discoveries and Opinions of Galileo*, ed. Stillman Drake (Garden City, NY: Anchor Books, 1957), 87-144.
- Galileo, *The Assayer* (1623), in Drake, ed., *Discoveries and Opinions*, 229-280.
- Galileo Galilei, *Letter to the Grand Duchess Christina* (1615), in *ibid*., 145-216.

Week 2: What was known Part II

Read:

- Shapin Chapter 1
- Robert Boyle, *New Experiments Physico-Mechanical* (1660), in Boyle, *Works*, ed. Thomas Birch, 6 vols. (London, 1772), Vol. I, 1-117 (selections: 5-10, 15-19, 33-39, 69-70).
- Robert Hooke, *Micrographia* (London, 1665), selections: preface, 1-5, 112-116, 153-154, 171-172, 175-180, 210-217, 242-246.

Week 3: How did they know it? Part I

Read:

- Shapin, Chapter 2
- William Harvey, *De motu cordis* (Frankfurt, 1628), Preface, Introduction, Exs. 1, 8, 9, 10, 12
- Thomas Sprat, *The History of the Royal Society of London, For the Improvement of Natural Knowledge* (London, 1667), 15-21, 25-28, 32-34, 46-115,155-172, 378-397

Week 4: How did they know Part II

Read:

- Shapin, Chapter 2
- Shapin, Steven 1999 [1988], "The House of Experiment in 17th Century England." 479-504 in Biagioli, Mario (Ed.) 1999, *The Science Studies Reader*. NY: Routledge.

Week 5: What was knowledge used for? Part I

Read:

- Shapin, Chapter 3
- Isaac Newton, *The Mathematical Principles of Natural Philosophy*, trans. Andrew Motte, 2 vols. (London, 1729): The Laws of Motion, vol. I, 19-21; The General Scholium, vol. II, 387-393.
- Isaac Newton, *Opticks*, 4th ed. (London, 1730), Query 31, 350-382.

Week 6: What knowledge was used for Part II

****Mid-term exam****

Read:

- Shapin, Chapter 3
- John Maynard Keynes, "Newton, the Man," in *The Royal Society, Newton Tercentenary Celebrations, 15-19 July 1946* (Cambridge: Cambridge University Press, 1947), 27-34.
- John Brooke, "The God of Isaac Newton," in *Let Newton Be! A New Perspective of His Life and Works*, eds John Fauvel, Raymond Flood, Michael Shortland, and Robin Wilson (Oxford: Oxford University Press, 1988), 168-183.

Unit II: Philosophy of Science: Values and Gender

Week 7: Transition: From the History of Science to Science Studies

****Writing assignment for Unit I due****

Read:

- Jacob, Margaret C. 1999. "Science Studies after Social Construction" in Bonnell, Victoria and Lynda Hunt (eds.) *Beyond the Cultural Turn: New Directions in the Study of Society & Culture*, Berkeley: University of California Press.
- Jasanoff, Sheila. 2000. "Reconstructing the Past, Constructing the Present: Can Science Studies and the History of Science Live Happily Ever After?" *Social Studies of Science* 30(4): 621-31.
- Stepan, Nancy L., "Race and Gender: The Role of Analogy in Science," In *The 'Racial' Economy of Science,* Ed. Sandra Harding, Bloomington: Indiana University Press.

Week 8: The Science of Gender and the Philosophy of Science

Read:

- Fine, Chs. 1-2
- Hrdy, Sarah Blaffer 1986, "Empathy, Polyandry, and the Myth of the Coy Female" In *Feminist Approaches to Science*

Week 9: The Science of Gender and the Philosophy of Science

Read:

- Fine, Chs. 3-5
- Intemann, Kristen 2005, "Feminism, Underdetermination, and Values in Science," *Philosophy of Science* 72(5)

Week 10: The Science of Gender and the Philosophy of Science

****Outline for second paper due****
****PowerPoint due****

Read:

- Fine, Chs. 6-8
- Lloyd, Elisabeth 1996, "Science and Anti-Science: Objectivity and Its Real Enemies," in L. Nelson and J. Nelson (eds.), *Feminism, Science and the Philosophy of Science*, Kluwer

Week 11: The Science of Gender and the Philosophy of Science

Read:

- Fine, Chs. 9-11
- Anderson, Elizabeth 1995, "Knowledge, Human Interests, and Objectivity in Feminist Epistemology," *Philosophical Topics* 23:2

Week 12: The Science of Gender and the Philosophy of Science

Read:

- Fine, Chs. 12-14
- Martin, Emily 1991, "The egg and the sperm: How science has constructed a romance based on stereotypical male-female roles," *Signs: Journal of Women in Culture and Society* 16

Week 13: The Science of Gender and the Philosophy of Science

Read:

- Fine, Chs. 15-16
- Soble, Alan 2003, "The History of Sexual Anatomy and Self-Referential Philosophy of Science," *Metaphilosophy*, 34(3)

Week 14: The Science of Gender and the Philosophy of Science

Read:

- Fine, Chs. 17-Epilogue
- Wylie, Alison, 1996, "The Constitution of Archaeological Evidence: Gender Politics and Science," In Peter Galison and David Stump (eds.) *The Disunity of Science*, Stanford: Stanford University Press

****Final Exam during finals week****

****Writing assignment for Unit II due during finals week****