Science and Technology Studies 201: *Where Science Meets Society*

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5231 Social Sciences Building
MW 1:20–2:10, plus discussion section

What is science? What, if anything, is special about the way that scientists and engineers generate knowledge? In university courses, we absorb many implicit rules about what makes for good scientific work—lab reports should be written in the third person, papers must have citations (but not to Wikipedia!), double-blind studies are better than anecdotal evidence—but rarely do we have the opportunity to reflect on why it is that we are taught to know in this way. This course identifies and questions common (but often unstated) assumptions about what science is and how it works, with the aim of revealing the connections between the STEM fields and our social, cultural, economic, and political lives. The first unit introduces central ideas in Science and Technology Studies (STS), a field that uses perspectives from the humanities and social sciences to analyze STEM. We will examine whether the scientific method is an accurate description of how science and technology development operate in practice, and if not, what kinds of descriptions might be put in their place. Unit two examines how culture, economics, and politics interact with science and technology development. We will ask who benefits from how particular research agendas or new technologies are designed, and who bears the risks of living with uncertain science or dangerous technologies. The final unit explores how societies can engage with controversial issues in STEM. After exploring the rationales for and barriers to involving non-scientists in decision-making, we will collectively choose several controversial current topics to explore in depth (such as stem cell research, digital media and copyright, or bioterrorism), and one of these topics will be the basis for an in-class exercise in participatory science policy.

This course is aimed at students with backgrounds in either the sciences or the humanities who want to think more critically about the interactions between of science, technology, and society, and it serves as the foundational course for students enrolled in the ISSuES certificate program (`http://www.sts.wisc.edu/education/ISSuES.html`). It will allow students in the STEM fields to reflect on the

implications of their work for society, and students in the humanities and social sciences will develop a better understanding of how to study STEM as a social activity. There are no prerequisites for this course.

Course Objectives

After successfully completing the course you will be able to:

- Identify and reflect on your own assumptions about what science and technology are and how they work, especially your assumptions about the relationship between STEM and society;
- Explain key concepts from the field of Science and Technology Studies and apply them to novel case studies;
- Reflect on how scientific agendas or technological designs could be constructed differently with different societal aims in mind;
- Describe different models for public engagement with STEM policy issues, compare their benefits and limitations, and analyze controversial issues using these models.

Course materials

There is one required text for this course:

- Sergio Sismondo (2010) *An Introduction to Science and Technology Studies* (Wiley-Blackwell, 2nd edition).

Copies of this text will also be available on reserve at College Library (in Helen C. White Hall). All additional readings will be available electronically on Canvas.

A subscription to Top Hat is recommended but not required for participating in lectures. More information about how to purchase a Top Hat subscription and use it in class is available on Canvas.

Course Assignments

Assignment	*% of final grade*	*Due date*
Discussion participation	15%	Formative assessment at mid semester
Rhetoric assignment	15%	October 9
Controversy case study	25%	October 30
Consensus conference	20%	December 1
Take-home final/term paper	25%	December 18
Top Hat participation	+0.5%	Bonus for participating in more than 75% of lectures

Discussion participation Your participation grade will be based on your attendance in section, preparation for section, and the quality of your participation in discussions and section exercises. A detailed rubric outlining expectations for discussion participation will be distributed in section, and you will receive feedback on and an interim grade for your discussion participation midway through the semester. Attendance and participation in lecture does not count towards this component of your grade.

Rhetoric assignment In this assignment, you will write two short pieces on same topic in different writing styles—one in the form of a scientific report, and the other in the form of an opinion piece. The aim of this assignment is to explore how rhetorical choices create different forms authority and credibility in scientific writing, and to gain a greater awareness of how you use rhetorical devices in your own writing. Instructions and a grading rubric for this assignment will be distributed in section.

Controversy case study This assignment asks you to take a current scientific, medical, or technological controversy of your choosing and analyze it using the concepts learned so far in class. Applying the analytical tools you have acquired to a current case will help you both in making sure you understand key course concepts, and in formulating well-supported opinions on controversial science policy or ethics questions. Instructions and a grading rubric for this assignment will be distributed in section.

Consensus conference In this assignment, we will conduct a mock "consensus conference" to debate a science or technology policy issue of the group's choosing in class, and you will play the role of either a citizen or a researcher. More details on this assignment and the grading rubric will be distributed in class, and time will also be allocated in section for preparation in the weeks leading up the conference.

Take-home final exam The final exam is a take-home assignment where you will choose three of four short essay questions to write on, using course readings as your sources. The take home essay prompts and the grading rubric will be distributed and discussed on the final day of lecture. You also have the option of writing a term paper equivalent in length to the take home final on a topic of your choosing instead of writing the exam. If you want to take this option, you must meet with me to discuss and approve your proposed paper topic by the end of unit two (Nov 10).

Course policies

Email In a course of this size, it's impractical for us to answer questions over email. Please use one of the following two options to get in touch with us: For short questions, please post on the discussions forum on the Canvas website, and your TA or I will reply there within 24 hours. For longer questions or questions that you don't want to post publicly, please come see me or your TA during office hours. If you are not able to meet during office hours, you can email us to arrange an alternative meeting time.

Absences You are allowed one freebie (no questions asked) absence from section, which you can take at any time during the semester without consulting me or your TA. After that, unexcused absences will count against your participation grade. For absences due to illness, family emergencies, scheduled conflicts, or other legitimate reasons, you can make up the missed participation grade by handing in a 250 word informal reading response instead of attending class. You must contact me or your TA in advance of the missed class (except in exceptional circumstances) to clear your absence and agree on a due date for your reading response.

Assignment deadlines and grading: All assignments will receive a numeric score (e.g. 29/30), which will be displayed in Canvas. Your total numeric score will be converted into a final letter grade using the conversion table below. Scores falling below these cutoffs will not be rounded up). If you are facing circumstances are making it difficult for you to meet assignment deadlines (including personal circumstances such as uncertain housing, lack of food, health issues, family crises), I am happy to discuss deadline extensions or other accommodations with you (you can also contact the Dean of Students Office for assistance with these issues `https://doso.students.wisc.edu/student-assistance/`). If you do not make prior arrangements with me or your TA, late assignments will lose 3% of the total assignment points per day late.

A	AB	B	BC	C	D	F
93.0–100%	88.0–92.9%	83.0–87.9%	78.0–82.9%	70.0–77.9%	60.0–69.9%	0–59.9%

Students with disabilities I am happy to discuss academic accommodations for students with disabilities. Please present your McBurney visa to me within the first three weeks of the semester so that there is enough time for appropriate arrangements to be made.

Academic Integrity All students are expected to adhere to the University of Wisconsin—Madison's core values regarding academic integrity. Plagiarism or other academic misconduct may result in a zero on the assignment or exam, a lower grade in the course, or failure in the course. See the Dean of Students Office for more information about the academic misconduct process (`http://students.wisc.edu/doso/acadintegrity.html`).

Course Schedule

Week 1: Introduction (September 6)

No assigned readings

Unit 1: What is science, and how does it work?

Week 2: Separating science from non-science (September 11/13)

- Sismondo (2010) "Chapter 1: The prehistory of science and technology studies."

- Discovery Institute (2014) "The college student's back to school guide to intelligent design."

Week 3: The limits of observation and experimentation (September 18/20)

- Sismondo (2010) "Chapter 10: Studying laboratories."
- Niaz (2015) "Myth 19: That the Millikan oil drop experiment was simple and straightforward."

Week 4: Presenting evidence and arguments (September 25/27)

- Sismondo (2010) "Chapter 13: Rhetoric and discourse."
- Cohn (1987) "Nuclear language and how we learned to pat the bomb."

Week 5: Resolving controversies (October 2/4)

- Sismondo (2010) "Chapter 11: Controversies"
- Collins and Pinch (1998) "The sun in a test tube: the story of cold fusion."

Week 6: Descriptive and normative theories of STEM (October 9/11)

- Sismondo (2010) "Chapter 2: The Kuhnian revolution."
- Fox Keller (1983) "A feeling for the organism."

Unit 2: STEM in society

Week 7: Can STEM be "political"? (October 16/18)

- Kleinman (2005) "Science is political/technology is social."
- Gillespie (2006) "Designed to effectively frustrate."

Week 8: Design and values (October 23/25)

- Sismondo (2010) "Chapter 9: Two questions concerning technology."
- Noble (1999) "Social choice in machine design."

Week 9: Stratification and discrimination (October 30/November 1)

- Sismondo (2010) "Chapter 4: Stratification and discrimination."
- Hicks (2016) "Against meritocracy in the history of computing."

Week 10: Living with risky science and technology (November 6/8)

- Collins and Pinch (1998) "The naked launch: assigning blame for the *Challenger* explosion"
- Suryanarayanan and Kleinman (2011) "Disappearing bees and reluctant regulators."

Unit 3: Shaping science and technology

Week 11: Scientists, users, and citizens as agents of change (November 13/15)

- Sismondo (2010) "Chapter 15: Public understanding of science."
- Allen (2004) "Shifting boundary work: issues and tensions in environmental health science"

Week 12: Public understanding of science (November 20/22)

- No assigned readings and no sections this week

Thanksgiving break Nov 23–26

Week 13: Public engagement (November 27/29)

- Sismondo (2010) "Chapter 16: Expertise and public participation."
- Guston and Keniston (1994) "Updating the social contract for science."

Week 14: Consensus conference (December 4/6)

- Meet in Memorial Union Festival Room for class on Dec 4 and 6
- Mohr and Raman (2012) "Representing the public in public engagement"

Week 15: Contemporary cases and conclusions (December 11/13)

- No assigned readings and no sections this week