INTRODUCTION TO SCIENCE AND TECHNOLOGY POLICY ANALYSIS
PUBLIC POLICY 650
WINTER 2019

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COURSE DESCRIPTION
Science and technology intersect with multiple areas of public policy. Think of the growing concerns over technological surveillance, the debates over policy for climate change mitigation, the challenges posed by global health crises, or the fear that American research and development competitiveness is eroding in a globalized economy. These issues reflect important questions about the relationship between science, technology, and public policy. Are scientific and technological developments governable, and if so, how and by whom? Is more and better science always better for policymaking? Who is the best judge of the value of scientific research programs and the validity of scientific findings? Are scientific and technological innovations generally socially beneficial, and who decides?

This course introduces theories and methodologies for science and technology policy analysis. You will learn how science and technology policy is made, with specific attention to the roles of government agencies, expert advisory committees, the private sector, and the public. You will learn qualitative analytical tools for science and technology policy analysis, including values analysis, technology assessment, and consensus conference design. And you will learn to apply cutting edge theories and approaches for governing science and technology to a number of policy problems. This analytic toolkit will be drawn from literature in a range of disciplines, including political science, philosophy, sociology, history, and the science of science policy.

This course will provide:
• Background on the science and technology policy environment
• An understanding of the “social science” of science and technology policy
• Skills to think critically about how science and technology can be used to help solve social problems
• A multidisciplinary toolkit for analyzing and influencing science and technology policy
• Expertise in conducting S&T policy analysis

PubPol 650 is a core course in the Science, Technology, and Public Policy (STPP) Graduate Certificate Program, but is not limited to STPP students. It is designed for graduate students from diverse disciplines, including public policy, public health, law, business, engineering and the social, biological, and physical sciences. No scientific, technical, or policy background is required to take the course.
 COURSE REQUIREMENTS

Class participation 25%
Class Discussion Board 25%
Papers:
  Research Funding Memo 10%
  Controversy Paper Proposal P/F
  Backgrounder 20%
  Governance Recommendation 20%

A. **Class participation.** This is a discussion-intensive course. Preparation, attendance, and active participation are mandatory and will be important parts of your final grade. Each class session includes discussions and activities that require that you have read the week’s readings. Your preparation for class should not be a passive process of absorbing facts from readings; rather, while reading, you should actively identify (and write down!) questions you have, possible avenues of discussion, and potential points of application of the readings to current events. Along these lines, you should pay attention to current news in science and technology policy. These topics will often come up in class as examples. Some of my favorite sources for keeping up with this news are: Nature News and Comment (nature.com) @NatureNews; NYT Science @NYTScience; and Guardian science @guardianscience.

B. **Class Discussion Board** To assist you in fulfilling (A), during the course of the semester you will post on the class discussion board in advance of ten class meetings. At least three posts should be stand-alone posts based on the readings (300-400 words in length); at least seven should be comments on/responses to your classmates’ posts (200-250 words in length). Each post should be for a separate day of class. You are welcome to write additional posts or comments, either on the readings or on current events/news related to the class, etc.

The discussion posts and comments should not summarize the reading. They are think pieces—opportunities for you to refine questions and/or discuss insights from the readings. Your entries should reflect holistically on all of the readings assigned for the day, not just one or two pieces. You can also use your posts to explore the relationship between the readings and the topics chosen for your class papers, between a particular set of readings and readings from another week, or between the readings and current events. **Treat these posts as formal pieces of writing. Be clear and succinct.**

**Posts** should be up by **Sundays at 8 pm**, and **comments** by **Monday at 10 pm**. I will draw on them to frame discussion.

Posts will be graded on a scale of 0 to 3, with the expectation that most posts will receive a 2.

**Discussion Board Rubric**

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<thead>
<tr>
<th>Points</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
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<tbody>
<tr>
<td>Criteria</td>
<td>Accurate, thoughtful and holistic analysis/response. Evidence of exceptional effort and insight.</td>
<td>Good effort to connect most/all readings. Demonstrates reasonable effort and insight.</td>
<td>Responds in general way; lack of specificity or insight indicates more time was needed to flesh out reflection.</td>
<td>Provides only summary; shows little engagement or insight; clear that work was hurried or careless.</td>
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C. **Written Assignments**: The course emphasizes writing for the policy environment, which may be a new skill for some of you. Policy writing requires front-loaded arguments, concision, clarity, and specificity. We’ll discuss the genre, individual paper requirements, and tips throughout the term and in advance of assignments. I’m also available to meet with you regarding this, as are the Ford School’s Writing Instructors. All students in the course—even if you are not a Ford student—can meet with them. If you want to make an appointment, you can do so here: [https://fordschool.mywconline.com/](https://fordschool.mywconline.com/) Note that you must first register with the site (i.e., create a login and password). Plan ahead—they book up quickly.

1. **Research Funding Written Testimony**: Choose an area of research that you believe deserves more government funding, and a stakeholder (e.g., a scientific/professional organization, patient advocacy organization, or civil society group) who is interested in increasing research funding this area. You, on behalf of your organization, have been asked to testify in front of a U.S. Congressional committee (you must find the relevant committee and address your memo accordingly) to make your case. Using no more than 700 words, provide written testimony explaining why Congress should increase funding for your desired area of research. Compelling written testimony will include answers to the following questions: Why is this area of research in the public interest? Why and how will it benefit the country? What is the return on the investment? As you write this memo, you’ll need to think hard about how to explain and justify this area of research (and the need for government research funding in particular) to a “lay” audience and the most powerful way to make your case to decisionmakers in this venue. (Hint: both the audience and politics matter in terms of how you frame your argument and evidence!)

Keep in mind that you are purposely being asked to make a complex argument in a very limited space in order to ensure that your writing is concise.

2. **Science or Technology Policy Controversy Papers**
   a) **Topic Choice**. Choose an ongoing controversy related to a specific science or technology policy that you want to focus on for your last two papers. There are a variety of possibilities to choose from, but it is very important that you choose a current, specific controversy that is being actively discussed by stakeholders and policy officials. Controversies are likely to focus on one of two questions: 1) should an area of science or technology move forward (e.g., proposals for developments pertaining to synthetic biology, geoengineering, natural resource development, etc.); or 2) should we regulate a particular area of science and technology (e.g., greenhouse gases/fossil fuels, genetically modified organisms, genetic testing). Choose a local, state, or national context in which an actual controversy is taking place. Answer the following questions: What are the main topics of controversy, and what is the history and context of the issue? What is the evidence of a live, ongoing controversy? Who are the stakeholders involved? Who are the decisionmakers involved? Who are the experts involved? Why is this controversy of interest to you in the context of this course? Is any specific policy or legislation being debated?
b) **Backgrounder.** This paper should provide an analytic explanation of your controversy. It should be addressed to a real decisionmaker in the controversy, from you as a science and technology policy analyst. It should use concepts, skills, and analytical approaches from the course to clearly, succinctly, and neutrally explain the issues underlying the controversy. Your memo should include a brief history of the controversy, an overview of the stakeholders involved (who they are, their interests, values, and positions on the issue), the main issues of controversy, and any previous efforts at resolution. Be sure to be specific. All of this information should be conveyed in the context of your explanation of what the main issues of the controversy are. Beneath the surface, what disputes over values, expertise, knowledge, power, etc., are at play? This paper should be no more than 1000 words. Be sure to use analytical concepts and tools from the course in your analysis.

c) **Governance Recommendation.** Choose one or more of the approaches designed to resolve science and technology policy controversies that you think is/are best suited to help address or resolve your policy controversy. Write a memo to a decisionmaker involved in the controversy (i.e. someone who would be in a position to implement your proposal) that: 1) explains why your approach is the best means to address your controversy; and 2) provides a blueprint for implementing your approach. Be specific: who should be involved and how will the process work? How will you ensure that the mechanism makes a difference in the controversy? Why is this a better approach than previous or status quo approaches in this or similar policy controversies? What political benefits—in the form of transparency, democratization, etc.—does your proposal offer? What kinds of concerns might the decisionmaker have about your proposal, and how will you respond (i.e., address counterarguments)? Be specific! This paper should provide a blueprint for putting your chosen approach into action in your specific controversy. This paper should be no more than 1200 words. Be sure to use concepts from class discussion and the readings in your analysis. You do not need to revisit the background discussed in the “Backgrounder” memo.

**COURSE POLICIES**

1. Attendance: Because this course depends heavily upon discussion and in-class scenarios, I expect students to make every effort to attend all class sessions. Please notify me in advance if you will miss class; excused absences can be granted for things like illness and family emergencies, but only if I hear from you in advance. Any unexplained absences will negatively affect your grade. So will repeated tardiness; I expect you to arrive on time. Please also refrain from going in and out of the room during class.

2. Late assignments: Extensions require arrangements with the instructor made well in advance of the due date. Late assignments will lose five points for each 12 hour period, or fraction thereof, that they are late.

3. Academic honesty: All students are expected to abide by the University’s standards of academic honesty, integrity, and professionalism. For details, see http://www.rackham.umich.edu/policies/academic_and_professional_integrity/.

4. Electronic devices: Laptops and other devices are NOT allowed in class. While I recognize that this may cause consternation, such technologies negatively impact the character and quality of class discussion. Because discussion is so important to the
intellectual task we face, the costs of laptops outweigh the benefits. Out of respect to the instructor and your fellow students, put your cell phone away for the duration of class.

5. Syllabus: Because many topics we cover are subjects of ongoing discussion, I may make occasional changes to the course readings over the semester. I will always notify you in advance of any changes.

FORD SCHOOL AND UM POLICIES

Inclusivity at the Ford School: Members of the Ford School community represent a rich variety of backgrounds and perspectives. We are committed to providing an atmosphere for learning that respects diversity. While working together to build this community we ask all members to:

- share their unique experiences, values and beliefs
- be open to the views of others
- honor the uniqueness of their colleagues
- appreciate the opportunity that we have to learn from each other in this community
- value one another’s opinions and communicate in a respectful manner
- keep confidential discussions that the community has of a personal (or professional) nature
- use this opportunity together to discuss ways in which we can create an inclusive environment in Ford classes and across the UM community.

Academic Integrity: The Ford School academic community, like all communities, functions best when its members treat one another with honesty, fairness, respect, and trust. We hold all members of our community to high standards of scholarship and integrity. To accomplish its mission of providing an optimal educational environment and developing leaders of society, the Ford School promotes the assumption of personal responsibility and integrity and prohibits all forms of academic dishonesty, plagiarism and misconduct. Academic dishonesty may be understood as any action or attempted action that may result in creating an unfair academic advantage for oneself or an unfair academic advantage or disadvantage for any other member or members of the academic community. Plagiarism involves representing the words, ideas, or work of others as one’s own in writing or presentations, and failing to give full and proper credit to the original source. Conduct, without regard to motive, that violates the academic integrity and ethical standards will result in serious consequences and disciplinary action.

Additional information regarding academic dishonesty, plagiarism and misconduct and their consequences is available at: http://www.rackham.umich.edu/current-students/policies/academic-policies...

Accommodations for Students with Disabilities: If you believe you need an accommodation for a disability, the University's Services for Students with Disabilities office (SSD) can be a valuable resource with which to start. In addition, if you believe you need an accommodation for a disability in any of your courses, please let the course instructor know at your earliest convenience. You need to allow sufficient time for your faculty member to respond, minimally 7 days, preferably more, in advance of when the accommodation is needed. Some aspects of courses may be modified to facilitate your participation and progress. As soon as you make your
instructor aware of your needs, they can work with Student & Academic Services and/or the SSD office to help determine appropriate academic accommodations. Any information you provide will be treated as private and confidential.

**Student Mental Health and Wellbeing:** The University of Michigan is committed to advancing the mental health and wellbeing of its students. We acknowledge that a variety of issues, such as strained relationships, increased anxiety, alcohol/drug problems, and depression, directly impacts students’ academic performance. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. For help, contact Counseling and Psychological Services (CAPS) and/or University Health Service (UHS). For a listing of other mental health resources available on and off campus, visit: [http://umich.edu/~mhealth/](http://umich.edu/~mhealth/).

**COURSE READINGS**
All readings are available on Canvas.

**COURSE SCHEDULE**

I. Thinking Critically about Science and Technology Policy

(1) Jan. 15: Themes, Mechanics, and Introductory Discussion

(2) Jan. 22: Technology, Innovation, and Public Policy (140 pp.)

(3) Jan. 29: Science, Social Construction, and Science Policy (120 pp.)
Ramya Rajagopalan and Joan H. Fujimura, “Making History via DNA, Making DNA from History: Deconstructing the Race-Disease Connection in Admixture Mapping.” In Keith
II. Rethinking Science Funding to Solve Social Problems

(4) Feb. 5: National Research Policy in Historical and Comparative Perspective (140p.)
Vannevar Bush, Science: The Endless Frontier. A Report to the President (US GPO, 1945), Ch. 6.
Mariana Mazzucato, The Entrepreneurial State: Debunking Public vs. Private Sector Myths (Public Affairs, 2015), 1-16, 63-77.

(5) Feb. 12: Rethinking the Economic and Social Benefits of Research (190 pp)
Jack Stilgoe, “Could the best way to make money from science be to give it away for free?” The Guardian, Dec. 16, 2016. Link


**February 22, 8 pm: Research Funding Paper Due!**

### III. The Politics of Knowledge and Expertise

(7) **Feb. 26: The Political Environments of Science and Technology Policy** (95 pp.)


**Mar. 5: NO CLASS**

(8) **Mar. 12: Science and Scientists in Policy Controversies** (160 pp.)

(9) **Mar. 19: Complicating the Idea of Expertise** (150 p.)
FILM: *How to Survive a Plague* (watch at least first 45 min.)


**March 22, 8pm: Controversy Papers Topic Choice due!**

(10) Mar. 26: Risk, Uncertainty, Ignorance, and Trust in Policymaking (100 pp.)
California Ocean Science Trust, Putting the Pieces Together (2014).


IV. Rethinking S&T Governance

(11) Apr. 2: New Challenges for Governance, New Approaches to Governance (95 pp.)


http://commonreader.wustl.edu/c/gmos-not-so-fast/


(12) April 9: Governance Tools I: Technology Assessment (170 pp.)


**April 12, 8 pm: Controversy Backgrounder Due!**

(13) April 16: Governance Tools II: Democratic Deliberation (110 pp.)


(14) April 23: Sociotechnical Breakdowns (100 pp)


Richard Hindmarsh, ed. *Nuclear Disaster at Fukushima Daiichi: Social, Political, and Environmental Issues* (Routledge, 2013), pages 1-11 (to remind you of the Fukushima disaster chronology), and Chapter 3.


RECOMMENDED:


Watch *Into Eternity: A Film for the Future* (Dir. Michael Madsen, 2010).

**April 29, 8pm: Governance Recommendation Due!**