EGRS & PSTD 251 | Fall 2011

The Governance of Technology:
An Introduction to Engineering and Public Policy

Upon this gifted age, in its dark hour,
Rains from the sky a meteoric shower
Of facts...they lie unquestioned, uncombined.
Wisdom enough to leech us of our ill
Is daily spun; but there exists no loom
To weave it into fabric.

Edna St Vincent Millay
from ‘Upon this age that never speaks its mind’

—Overview and General Information—

**Instructor**  
Benjamin Cohen

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518 Acopian Engineering Center, Engineering Studies Program

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610.330.3058

**E-mail**  
cohenb@lafayette.edu

**Office Hours**  
Mon & Weds 9:00-11:00 am, and by appointment

**Required Readings**  

**Readings**  
ESRI (2010). *Getting to Know ArcGIS Desktop* (for ArcGIS 10)
The *NY Times* Technology Section, on-line
Numerous additional required readings available via Moodle, EGRS.PSTD.251_FA11

**Class times and locations**

Lecture/discussion:  
MWF, 1:10 pm-2:00 pm in AEC 306

Lab Section 1:  
Tues., 8:00-10:50 am in AEC 223b

Lab Section 2:  
Thurs., 8:00-10:50 am in AEC 223b

*Note that we will have GIS instructional leadership and support from Prof. Rosenbauer in lab meetings.*

**Assignment Values**

10%  
GIS quizzes + Mid-term

10%  
Debates and other lab-time exercises

20%  
HW (includes reading responses, film reviews, and others TBA)

20%  
Class participation

10%  
Group project #1

30%  
Group project #2 (final project)

5%  
Abstract and progress report

5%  
Annotated Bibliography

20%  
Final product, a multi-page website
Course Outline
This is an introductory course in the governance of technological systems. Its core purpose is to help students in engineering studies and policy studies inform the policy-making process with a robust, durable, and culturally grounded concept of technology. To paraphrase Edna St. Vincent Millay (above) and play the metaphor out, our goal is to build a loom for weaving the complexities of technology policy into a useful fabric.

Toward that end, the course introduces students to three dimensions of science, technology, engineering and public policy: (1) the political character of technologies, (2) the means by which decision-makers craft policies about those technologies, and (3) the ways technologies themselves are used in that process. We approach these dimensions in the first two-thirds of the class by introducing some key conceptual tools about technology-in-society from Engineering Studies (and its related field of study, science, technology, and society [STS]) and then by investigating the logistics of the policy-making process itself. In parallel, we also inform the governance of technology through the application of a specific tool, Geographical Information Systems (GIS), to aid the decision-making process. In the last third of the course, outside of class students develop a group project in an area of technology and public policy, while inside the class we pursue cases studies on energy, food, and global development to ground our analyses in real-world problems. Our goal is to draw from new tools both technical (like GIS) and non-technical alike (i.e., STS concepts) to examine the ways one can explain and suggest policy approaches for governing technological systems.

The course follows from a few cultural and historical observations. First is that ours is a technological society. To a remarkable degree, the infrastructure of our everyday world and the means through which we navigate that world are shaped by technological systems. Because of this, those who build technologies (engineers, primarily) are building infrastructure into our world in ways that will shape the options of current and future generations. Yet ours is also a democratic society, where, in its best framing, citizen participation shapes the means by which we make decisions as a polity and define our activities. The combination of these two situations introduces particular demands on civil society, since technologies—be they about communication, transportation, defense, energy, agriculture, healthcare, entertainment, or any other—are usually designed and produced by one group, experts, while the rest of the public then decides how best to manage and live within them. This tension between the expert-based technical realm of science and engineering, on the one hand, and the participatory aspirations of democratic society, on the other, provides the political basis of our study of engineering and public policy. It means that working through that tension demands particular methods and forms of analysis. Putting the course objective another way, this class introduces students to those methods and forms of analysis.

Logistically speaking, the class has a lecture and discussion meeting on MWF and a lab component on either Tuesday or Thursday (there are two sections of lab). The discussion-intensive lecture meetings will develop the key conceptual tools in STS and Engineering Studies through readings, homework, films, and various exercises. The course also requires active student involvement in classroom discussions. We will use lab time for a variety of activities. Primary among these are a series of GIS exercises intended to provide you with introductory proficiency with ArcGIS software, a program widely used in policy, planning, engineering, land development, marketing, public health, and more. We will also use lab time for debates, simulation exercises, and group project presentations.

Regardless of the student’s long-term career goals, this course allows those enrolled to understand the pervasive role of government in the technical arena and the need to use/manage technology within that context either as a technical professional or member of the public. The lessons learned from our focus on technological systems can be applied to other public policy contexts such as welfare, education, the
arts, healthcare, and more. Furthermore, while this class emphasizes US policy at the federal and local levels, we will also apply that context-based understanding to international scenarios.

These are the main student learning outcomes/goals of the course:

1. To learn and use key STS tools for conceptualizing technology, society, and policy, namely:
   a. That technologies are systems of technical and non-technical components, which together characterize them as socio-technical systems
   b. That technologies are value-laden
   c. That, along with technical features, cultural values shape the motivation for and identity of technological systems
2. To bring those concepts to bear in technology policy debates;
3. To learn to apply the tools of GIS for enacting those concepts in practice;
4. To develop a basic familiarity with the GIS software as preparation for extended study and use;
5. To gain an understanding of key actors in the policy-making process;
6. To gain familiarity with the basic process of policy-making in the U.S.;
7. To gain an understanding of the ethical context of engineering and public policy.

All told, students in this course should expect to become better prepared to understand the role of policy-making in technological development, the political character of technological systems, and the place of technologies in the policy process.

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**Honor and Academic Integrity**

Student-teacher relationships require trust. For example, students must trust that teachers have made responsible decisions about the structure and content of the courses they teach, and teachers must trust that the assignments students turn in are theirs. Acts that violate this trust undermine the educational process. Lafayette College’s Honor System helps maintain a community of trust. Generally I encourage you to talk to other students about the issues being addressed in the course, and I encourage you to read relevant written material in addition to that assigned in class. However, when it comes to written and oral assignments, the words must be your own and you must cite those whose ideas you use. Please note that for group projects, where some of these terms and issues are muddled, we will discuss further the boundaries of ethical behavior and academic integrity.

Ours will not be a laptop course, unless otherwise specified in class. That is, along with a standard request to silence and stow away your cell phones during class, I ask that you keep laptop screens closed out of respect for your peers and for the betterment of classroom atmosphere.

**More about course expectations**

**Written assignments:** For all submitted written work, I expect grammatical accuracy, mechanical soundness, and professional presentation. Sloppy and hurried writings reflect sloppy and hurried thinking. They are unacceptable for this course. Homework due on select days (see syllabus below) will act in part as checks on your reading comprehension, as brief writing opportunities, and as opportunities for you to work through questions and observations brought out by course readings and discussions.

Late assignments are generally not accepted. If you must miss a class, assignments are due before the class period begins. Discuss with me promptly any assignments due in a class missed because of illness.

**Keeping up with the Times, et al.:** I expect students to read through the “Technology” Section of the *New York Times* and related sites before each class (three times a week, minimum, that is). We will
sometimes use those examples as part of in-class work, though many times the purpose of this requirement is simply to help you familiarize yourself with the patterns of public discussions about various technological issues. You may, and should, rotate MIT’s Technology Review, which has a vibrant web presence, and The Atlantic’s on-line “Technology” blog into this thrice-weekly reading schedule.

**Class participation:** Class participation includes active attentiveness, interest, curiosity, discussion contributions, and other assorted assignments. Mere attendance, which is required, will not be sufficient to receive an outstanding participation grade. For this reason, I reserve the right to drop you (fail you) for insufficient attendance (more than two classes of unexcused absences). Come to class with curiosity, intellectual ambition, an open mind, some healthy skepticism, and the willingness to engage our topics. If you do that, the rest will take care of itself. To help this cause, to be prepared to participate, you need to complete assigned readings and problems prior to the class period, and to spend time critically analyzing them. Excellence in written work will not make up for delinquency in attendance or lack of preparation for class discussion.

**Group projects:** There are two group projects for the semester. The first is a smaller, introductory project that has teams of a mix of engineering studies and policy studies majors using GIS software to help frame a local technology policy issue. The second group project is the major course product. This will be an analysis of a technology policy issue in which students work in teams (the same ones as for the first project) to produce a publicly accessible website that summarizes the basic terms of the debate, uses GIS mapping to illustrate the spatial issues at hand in the debate, and provides a set of recommendations for decision-makers about how to approach the topic. It is a policy analysis, not policy advocacy, project. I will provide more details about this project and its milestones throughout the semester at Moodle.

**Debates:** I have included several issues on the schedule for debate during lab sessions. These debates will match up mixed teams of engineers and non-engineers who represent the pro side and the con side (and rebuttals). We will reserve the remaining class time for questions/discussion, and critique of the debaters.

Grading for the debate team is as follows:
absent = 0; present = 5 up to a maximum of 10 depending on the quality of the arguments.

The audience will be graded as well with a 0 if absent and from 5 to 10 for quality of questions/comments. The audience will vote for the winning team. Each present member of the winning team will receive a bonus of 2 points. I will judge your contributions based on how well you use the course material, how well you demonstrate that you understand the topic, and how well you verbally communicate. You may use graphs, figures, etc., but DO NOT prepare a formal power point presentation.

20-30 mins - Professor Cohen: Introductory lecture about the issue
10 minutes – Pro Argument 10 minutes – Con Argument
10 minutes – Pro Rebuttal Argument 10 minutes – Con Rebuttal Argument
20-30 mins – Class: Questions/discussion/critique

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<thead>
<tr>
<th>Grading Schema</th>
<th>A (93+)</th>
<th>A- (90-92)</th>
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<tbody>
<tr>
<td>B+ (87-89)</td>
<td>B (83-86)</td>
<td>B- (80-82)</td>
</tr>
<tr>
<td>C+ (77-79)</td>
<td>C (73-76)</td>
<td>C- (70-72)</td>
</tr>
<tr>
<td>D+ (67-69)</td>
<td>D (63-66)</td>
<td>D- (60-62)</td>
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—Course Syllabus, ver.5 (11Oct11)—
(SUBJECT TO REVISION)

Note: All readings are to be read for the day given below (as opposed to being assigned on that day). Any non-book reading is available at the class Moodle site.

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Monday</th>
<th>Weds</th>
<th>Friday</th>
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| Part I: Intro | 31 Aug. Intro to course | 2 Sept | Read: Forster  
Due Sunday @ 5: HW#1 |

Lab topic: no lab during first week of class (due to Hurricane Irene)

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<tr>
<th>Week 2</th>
<th>Monday</th>
<th>Weds</th>
<th>Friday</th>
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| Part II: Thinking about technology | 5 Sept. On tech. & eng. in historical context  
Read: Nye, Ch. 1 | 7 Sept.  
Read: L. Marx; Sarewitz | 9 Sept.  
...cont. with Marx and Sarewitz  
Due by class: HW#2 |

Lab topic: Working with GIS; Read: GIS Chapters 1, 2, 3, 4

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<tr>
<th>Week 3</th>
<th>Monday</th>
<th>Weds</th>
<th>Friday</th>
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| 12 Sept. On tech. in cultural context  
Read: Surowiecki | 14 Sept.  
Read: Shapin | 16 Sept.  
Read: Nye, Ch. 2 + 4 |

Lab topic: Working with GIS; Read: GIS Chapters 5, 6, 7, 8; quiz

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<tr>
<th>Week 4</th>
<th>Monday</th>
<th>Weds</th>
<th>Friday</th>
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| 19 Sept. On tech. in political context  
Read: Winner  
Due: HW #3 | 21 Sept.  
...cont. with Winner | 23 Sept.  
Class does not meet  
Students instead meet in groups to plan first GIS project |

Lab topic: Working with GIS; Read: GIS Chapters 9, 10, 11, 12

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<tr>
<th>Week 5</th>
<th>Monday</th>
<th>Weds</th>
<th>Friday</th>
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| Part III: Policy & Technology | 26 Sept.  
...cont. with Winner | 28 Sept. On tech., policy & the public sphere  
Read: V. Bush; Eisenhower; Leary | 30 Sept.  
Read: Beyond Sputnik, chapter 2  
Due: “Almost-midterm,” by Sunday, 10/2 @ 5 pm |

Lab topic: Working with GIS; Read: GIS Chapters 13-17; quiz

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<tr>
<th>Week 6</th>
<th>Monday</th>
<th>Weds</th>
<th>Friday</th>
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| 3 Oct. The players in policy  
Read: Stine, pp. 1-14; Beyond Sputnik chapter 3 | 5 Oct. The players in policy  
Read: Stine, pp. 25-35 | 7 Oct. The process  
Read: Nye, Ch. 8; Beyond Sputnik chapter 4 |

Lab topic: GIS presentations of first group project (first hour); the Swedish Traffic example

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<tr>
<th>Week 7</th>
<th>Monday</th>
<th>Weds</th>
<th>Friday</th>
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| 10 Oct. Fall Break  
Class does not meet | 12 Oct. Policy briefs  
Topic: The course project  
Read: Back to Nye, Ch. 8 + Beyond Sputnik Ch. 4  
Due: Project #1 work memo |

Lab does not meet this week, Fall Break

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<tr>
<th>Week 8</th>
<th>Monday</th>
<th>Weds</th>
<th>Friday</th>
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| Part IV: Case studies | 17 Oct.  
Class does not meet  
Groups meet for project work | 21 Oct.  
Class does not meet  
Groups meet for project work  
Due: Abstract for Final Project |

Lab topic: field trip either to the Nurture Nature Center (for water) or the Lafayette Community Garden (for land)
**Week 9**

<table>
<thead>
<tr>
<th>24 Oct.</th>
<th>Energy</th>
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<tbody>
<tr>
<td><strong>Listen to:</strong> “Game Changer”; “Power Head” podcasts</td>
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<tr>
<td><strong>Note:</strong> a subset of students will help frame this issue based on its relevant broader contexts</td>
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| 26 Oct. | ...continue fracking |

<table>
<thead>
<tr>
<th>28 Oct.</th>
<th>Topic: The course project</th>
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<tr>
<td><strong>Due:</strong> Film response #1 [Gasland]</td>
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**Lab topic:** Debate on Fracking

**Week 10**

<table>
<thead>
<tr>
<th>31 Oct.</th>
<th>Food: GMO</th>
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<tr>
<td><strong>Read:</strong> Kleinman; Raven</td>
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<tr>
<td><strong>Note:</strong> a subset of students will help frame this issue based on its relevant broader contexts</td>
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| 2 Nov. | ...continue from Monday |

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<tr>
<th>4 Nov.</th>
<th>Class does not meet</th>
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<tr>
<td><strong>Due:</strong> Annotated bibliography for Final Project</td>
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**Lab topic:** Debate on GMO

**Week 11**

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<tr>
<th>7 Nov.</th>
<th>Tech. &amp; Env. Justice</th>
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<td><strong>Read:</strong> Lerner; Ottinger</td>
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<tr>
<td><strong>Note:</strong> a subset of students will help frame this issue based on its relevant broader contexts</td>
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| 9 Nov. | ...continue from Monday |

| 11 Nov. | **Due:** Film response #2 [Blue Vinyl]; Web mock-up of Final Project |

**Lab topic:** field trip either to the Nurture Nature Center (for water) or the Lafayette Community Garden (for land)

**Week 12**

<table>
<thead>
<tr>
<th>14 Nov.</th>
<th>Global dev.</th>
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<tr>
<td><strong>Read:</strong> Bilger; Wainaina</td>
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<tr>
<td><strong>Listen to:</strong> “Good Water”</td>
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<tr>
<td><strong>Note:</strong> a subset of students will help frame this issue based on its relevant broader contexts</td>
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| 16 Nov. | ...continue from Monday |

| 18 Nov. | Topic: Project updates and discussion |

**Lab topic:** Debate on solar cookers and foreign technology aid

**Week 13**

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<th>21 Nov.</th>
<th><strong>Read:</strong> TBA</th>
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| 23 and 25 Nov. | Thanksgiving Break (no class) |

**Lab does not meet this week**

**Week 14**

**Back to the Future**

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<tr>
<th>28 Nov.</th>
<th><strong>Read:</strong> Cat’s Cradle</th>
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| 30 Nov. | **Read:** Cat’s Cradle |

| 2 Dec. | Project presentations |

**Last lab meeting of the semester**

**Week 15**

<table>
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<tr>
<th>5 Dec.</th>
<th>Project presentations</th>
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| 7 Dec. | Project presentations |

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<tr>
<th>9 Dec.</th>
<th><strong>Required readings:</strong></th>
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**Probable film options** (specifics as yet undetermined at the time of Syllabus ver.1):
1. **Gasland** [energy—hydraulic fracturing]
2. **Black Diamond** [energy—mountaintop coal removal]
3. **The Last Mountain** [energy—mountaintop coal removal]
4. **Petropolis** [energy]
5. **Food, Inc.** [food—alternative agriculture]
6. **Lunch Line** [food—school lunch program, federal policy]
7. **Fresh** [food—alternatives to industrial]
8. **Food Fight** [food—alternative agriculture]
9. **Flow** [water]
10. **Tapped** [water]
11. **Thirst** [water]
12. **Blue Gold** [water]

**Extra resources, or, if this were an advanced course these readings would be on the syllabus:**


Special Analysis of R&D in the Homeland Security Department, at http://www.aaas.org/spp/rd/dhs0621.htm


