

## EGRS 451 | Fall 2013

**Capstone Seminar on Engineering and Society (W)***version 3.0, November 1, 2013*

*All EGRS courses work towards actively building and sustaining an inclusive community of learners and contributors. This class fully subscribes to Lafayette College's commitment to promoting diversity including (but not limited to) race, ethnicity, socioeconomic status, gender, gender identity, sexual orientation, religion, disability, and place of origin.*

**—Overview and General Information—**

<i>Instructor</i>	Benjamin Cohen
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<i>Office Hours</i>	Tues & Thurs 11:00 am-12:00 pm, Weds, 1:00-3:00 pm, and by appointment
<i>Readings</i>	Required readings available as *.pdf or hyperlinks via Moodle, EGRS.451_SP13 Lucena, J., J. Schneider, and J. Leydens, eds. (2010) <i>Engineering and Sustainable Community Development</i> (Morgan Claypool) Wisnioski, M. (2012) <i>Engineers for Change: Competing Visions of Technology in 1960s America</i> (MIT)

**Class times and locations**

Tues/Thurs, 9:30—10:45 am, AEC 315

**Course Description**

This is the senior capstone for majors in the Engineering Studies Program. It is a writing-intensive class intended to provide students with a culminating seminar-style experience. The general theme of the course focuses on the place of engineering and technology in society. We examine the ways cultural values shape technologies, social foundations define the role of engineers, and engineers influence the broader world in efforts to achieve progress. The course asks students to apply the knowledge they gained from both engineering and non-engineering courses to tackle these engineering/society relationships. In this vein, we take the lessons of political philosophy, historical context, cultural awareness, communication, technical proficiency, economic theory, and environmental knowledge from the class prerequisites and apply them to original projects here on campus and the Lehigh Valley region. As a seminar course, students are expected to play an active role in managing the classroom—leading sessions, presenting results, organizing classes, and discussing material.

Students who graduate from the program are expected to have interdisciplinary learning and communication skills, to understand the historically changing place of engineering and technology in society, and to provide leadership in public debates about technology, economy, public policy, and environmental sustainability. Students with this training are prepared to be engineers, policy makers and advisors, planning facilitators, community organizers, consultants,

environmental specialists, and more. The capstone seminar allows you to finalize your preparation for that future.

### **Prerequisites**

EGRS 251 (Engineering & Public Policy) and EGRS 261 (Engineering Economics & Management)

### **Assignment Values**

25%	Participation, including discussion leading opportunities
30%	Response Essays + other misc. writing assignments
10%	Interim project: design challenge
35%	Final project (as graded in several parts, including the first memo, first annotated bibliography, updated annotated bibliography, updated memo, classroom workshop contributions, and final version of the project [presentation, memo, and product])
P/F	Preliminary memo (individual document)
4%	Initial annotated bibliography
4%	Updated annotated bibliography
4%	Updated memo (group document)
3%	Classroom workshop contributions
20%	Final version of the project: presentation, memo and product

### **Specific Student Outcomes:**

- 1) Conduct analyses of the cultural contexts of technologies and engineering.
- 2) Apply knowledge from your undergraduate curriculum to these analyses.
- 3) Demonstrate that your project research is part of an ongoing conversation among scholars.
- 4) Identify the social, ethical, and economic issues surrounding the information you use in that project.
- 5) Develop organization, management, and teamwork skills.
- 6) Demonstrate proficiency with a variety of communications skills.
- 7) Demonstrate overall preparation for the Engineering Studies arena.

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### **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 seminar. The Response Essays (REs) act in part as checks on your reading comprehension, as brief writing opportunities, and as places for you to work through questions and observations brought out by course readings and discussions.

I do not accept late assignments. 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.

**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. Reading alone is insufficient. Students must read *and analyze* texts.

**Discussion leading:** Each student, with two partners, will take the lead on class discussion for one class topic. These students will be required to prepare class discussion details, questions, themes, and exercises. They meet with me the Monday before class to review the class plan and share ideas and questions. There are four scheduled “interludes” throughout the semester during which these discussion leading classes take place.

**Class projects:** There are two main projects for the semester. One of these is an interlude design project that the class will conduct during the seventh week of the semester. That project will be explained as the week draws near. The second project is the final, main course project, one that asks students to combine the work of engineering with the work of a campus or community partner to produce a publicly available research study. The purpose of the project is three-fold: 1) to demonstrate the interdisciplinary skills of an EGRS major, 2) to develop a public presence for those skills, and 3) to show how EGRS majors can lead and push forward public debates about science, technology and engineering in society. That project is staged in phases, with a brief proposal, a memo that includes agreement from your selected community partner, a preliminary and then updated annotated bibliography, and the final product (which may be a report, a visual art display, a website, other on-line productions, a short video, a prospectus for future research, historical analyses, and more). I will provide more details about all projects and their milestones throughout the semester at Moodle.

**Information Literacy:** EGRS 451 also has an information literacy component to it, which means we will have help from Reference Librarian Lijuan Xu at Skillman in finding, evaluating, and using information. The purpose of this is to help us understand ways in which information is created, disseminated, and organized in our society. These skills are particularly important for our course because we are seeking to understand the field of Engineering Studies, its arguments, intellectual content, and influential texts. The info literacy components are built into the syllabus, specifically with article analysis exercises (Week 5), annotated bibliographies, and a bibliographic essay that centers on the topic of your final project. Those components are intended to help explore how information is disseminated and gathered in our field, to examine our methods and skills in seeking and using information, and to explore some of the economic, social, legal, and ethical issues that arise from new methods of producing and distributing information.

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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. At Lafayette College we maintain a community of trust by promoting a culture of honor, principle, and integrity. As this is a College of students, faculty, administrators, and staff, we work *as* a community to create such a culture. 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 is not 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.

### Cell Phone Policy

All cell phones must be silenced and stored away during class. Please do so out of respect for the class space and your classmates. Students who use their cell phones in class will be asked to leave.

### Grading Schema

	A (93+)	A- (90-92)
B+ (87-89)	B (83-86)	B- (80-82)
C+ (77-79)	C (73-76)	C- (70-72)
D+ (67-69)	D (63-66)	D- (60-62)

### Assignment summary

<i>Every class</i>	<i>Frequently</i>	<i>Occasionally</i>	<i>Semesterly</i>
<ul style="list-style-type: none"> <li>Attendance</li> <li>Readings and preparation for discussion</li> <li>Participation</li> </ul>	<ul style="list-style-type: none"> <li>Response</li> <li>Essays/Homework</li> <li>Notes on project ideas</li> <li>Synthesis of prior week and its relation to current week</li> </ul>	<ul style="list-style-type: none"> <li>Discussion leading</li> <li>Meeting with professor</li> <li>Meeting with Reference Librarians</li> <li>Article-in-review</li> </ul>	<ul style="list-style-type: none"> <li>Course-long project (<i>proposal; bibliographies; memo; presentation; final product</i>)</li> </ul>

### A note on credit hour provisions

The student work in this course is in full compliance with the federal definition of a four credit hour course. Please see the Lafayette College Compliance webpage for the full policy and practice statement.

### —Course Syllabus, draft ver.3—

Note: All readings are *to be read* for the day given below (as opposed to being *assigned* on that day). Almost all readings are available at the class Moodle site.

	Tuesday	Thursday	Misc.
Week 1 <i>Part I: Engineering &amp; Society</i>	Aug 27 <i>What is EGRS?</i> Introduction to the course Read: Lucena, et al.	Aug 29 ...cont. Lucena, et al.	<b>Due</b> Sunday, Sept. 1, by 5 pm: Response Essay #1
Week 2	Sept 3 <i>Where did eng. come from?</i> Read: Reynolds, 19 <sup>th</sup> c.	Sept 5 <i>Where did eng. come from?</i> Read: Reynolds, 20 <sup>th</sup> c.	<b>Due</b> Sunday, Sept. 8, by 5 pm: RE#2
Week 3	Sept 10 <i>a case study of eng. reform</i> Read: Wisnioski, chap. 1-3	Sept 12 ...cont. Wisnioski	
Week 4	Sept 17 Read: Wisnioski, chap. 6-8	Sept 19 Read: E2020; Seely	<b>Due</b> Sunday, Sept. 22, by 5 pm: RE#3
Week 5	Sept 24 Workshop @ Skillman Read: Nieuwsma and Riley	Sept 26 Workshop @ Skillman	
Week 6 <i>Part II: Tech &amp; Culture</i>	Oct 1 <i>technology &amp; culture Interlude #1</i> Read: Nye; Matthewman	Oct 3 ...cont. from Tues. <b>Due</b> by 5 pm: Prelim. Project Memo	<b>Due</b> Sunday, Oct. 7, by 5 pm: Annotated Bib.
Week 7 <i>Research Interlude</i>	Oct 8 <i>In-class flash design project</i>	Oct 10 ...cont.	
Week 8	Oct 15 <i>FALL BREAK</i>	Oct 17 Capstone project pitches	<b>Due</b> Friday by 5 pm: Updated ann. Bib.
Week 9	Oct 22 <i>tech. &amp; culture Interlude #2</i> Read: Schivelbusch <b>Required:</b> Galusky lecture, 7:30 pm	Oct 24 ...cont. tech & culture	
Week 10	Oct 29 <i>Project overview presentations, for in-class peer review</i>	Oct 31 ...cont. project workshop	
Week 11 <i>Part III: EGRS in Local Context</i>	Nov 5 <i>computers, for example Interlude #3</i> Read: Abbate and Gladwell	Nov 7 ...cont. computers <i>Project overview presentations, for in-class peer review</i>	<b>Due</b> Weds., 11/6, by 5 pm: Updated Project Memo
Week 12	Nov 12 <i>Project "product" demos for in-class peer review</i>	Nov 14 <i>Project "product" demos for in-class peer review</i>	
Week 13	Nov 19 <i>nature, for example Interlude #4</i> Read: Bijker; Klinenberg; Kimmelman; Mukerji [optional]	Nov 21 <b>No class:</b> students meet in capstone groups for project work	<b>Due</b> Sunday, Nov. 24, by 5 pm: RE#4
Week 14	Nov 26 Project revision discussions	Nov 28 <i>Thanksgiving Break</i>	<b>Due Nov 27:</b> final versions of project memo and product
Week 15	Dec 3 Presentations	Dec 5 Final class debriefing	<b>Due Dec. 9:</b> Revisions to project materials and prospectus for further work

**Other main reading sources (for reference)**Books

- Bijker, W., T. Hughes, and T. Pinch, eds. 1987. *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*. MIT Press.
- Christensen, S.H. and B. Delahousse, eds. 2009. *Engineering in Context*. Academica.
- Collins, H. and T. Pinch. 2002. *The Golem at Large: What You Should Know About Technology*. Cambridge University Press.
- Creager, A., E. Lunbeck, and L. Sheibinger, eds. 2001. *Feminism in Twentieth Century Science, Technology, and Medicine*. University of Chicago Press.
- Downey, G. and K. Beddoes, eds. 2011. *What is Global Engineering Education For?* Morgan & Claypool.
- Grasso, D. and M. Burkins, eds. 2009. *Holistic Engineering Education: Beyond Technology*. Springer.
- Kleinman, D. 2005. *Science and Technology in Society: From Biotechnology to the Internet*. Wiley.
- Latour, B. 1996. *Aramis, or the Love of Technology*. Harvard University Press.
- Lerman, N., R. Oldenziel and A. Mohun, eds. 2003. *Gender and Technology: A Reader*. Johns Hopkins University Press.
- Lucena, J., J. Schneider, and J. Leydens. 2010. *Engineering & Sustainable Community Development*. Morgan & Claypool.
- Mackenzie, D. and J. Wajcman, eds. 1999. *The Social Shaping of Technology*. Open University Press. 2<sup>nd</sup> Edition. [and 1<sup>st</sup> edition, 1985]
- Matthewman, S. 2011. *Technology & Social Change*. Palgrave MacMillan.
- Nye, D. 2006. *Technology Matters: Questions to Live With*. MIT Press.
- Riley, D. 2008. *Engineering and Social Justice*. Morgan & Claypool.
- Sismondo, S. 2003. *An Introduction to Science and Technology Studies*. Wiley-Blackwell.
- Wisnioski, M. 2012. *Engineers for Change: Competing Visions of Technology in 1960s America*. MIT Press.

Journals and presses to keep bookmarked

- Bulletin of Science, Technology, and Society* [on-line @Skillman through SAGE]
- Issues in Science and Technology* [on-line @Skillman through Academic One File]
- Journal of Engineering Education* [in print @Skillman, T61 .J64]
- Journal of Engineering Studies* [on-line @Skillman through Taylor & Francis]
- Science and Engineering Ethics* [on-line @Skillman through SpringerLink]
- Science, Technology and Human Values* [on-line @Skillman through SAGE and JSTOR]
- Social Studies of Science* [on-line @Skillman through SAGE and JSTOR]
- Technology & Culture* [on-line @Skillman through Muse and JSTOR]
- National Academy of Engineering publications, from the National Academies Press [on-line at <http://www.nap.edu/topics.php?topic=284>]

**Project ideas/topics to follow and build on from the Spring 2012 and 2013 classes:**

1. **Identity**—who EGRS majors are, what they do, and what their specialties are
  - a. Development, EWB, Study Abroad, ASB
  - b. History of Engineering at Lafayette
2. **Curriculum**—course development opportunities, curricular reform, short courses
  - a. Sports engineering
  - b. Entrepreneurship
  - c. Technology, Engineering, and Ethics
3. **Sustainability**—environmental projects on campus and in the community
  - a. Fracking politics
  - b. Green roofs
  - c. Student Farm (LaFarm) and Community Garden project coordination
  - d. Solar charger for portable electronics