ENGRG 3600 // LEC 001 // SPRING 2024

Ethical Issues in Engineering Practice

Course Description

This course surveys a range of ethical issues that arise in professional engineering, and provides discussion- and writing-based practice in analyzing and addressing them. Using normative frameworks from professional codes, philosophical ethics, value-sensitive design, feminist theory, and science & technology studies, the course engages with a series of historical, current, and fictional case studies. Specific topics to be discussed may include: privacy, consumer rights, smart cities, geoengineering, artificial intelligence, and cloning. Instruction is through a mix of lectures and discussions. Evaluation is by weekly quizzes, regular short writing assignments, essays, and a final exam; there will be no formal prelims.

Cross-listed and/or held with: PHIL 2471, STS 3601

Class No.: 9936   **Credit hours**: 3   **Credit option**: Letter grades or S/U, no audits

Prerequisites: Completion of at least one first-year writing seminar

Permission note: Limited to sophomores, juniors, and seniors

Major requirements: This course fulfills a liberal studies requirement for engineering majors.

Meeting times: (twice weekly for 75 minutes, days/times TBA), in (room number TBA)

Course website: (On Canvas, TBA)

Who Should Take This Course?

1. Engineering or computing students who want to understand the social and ethical impacts of technology and who want to make a positive impact on the world in their careers.

2. Engineering or computing students who have leadership ambitions and want to be prepared to make and justify difficult decisions.

3. Students in philosophy, science & technology studies, or other humanities or social science disciplines who are interested in the social, ethical, or cultural aspects and effects of engineering and technology.

4. Students interested in policy-making and regulation with regard to technology.

5. Students in any major who are concerned about the social and ethical impacts of technology.

Instructor

Dr. Trystan S. Goetze (they/them/theirs), Senior Lecturer in the Ethics of Engineering, and Director of the Bovay Program in the History & Ethics of Professional Engineering.

✉ tsgoetze@cornell.edu ☎ 607-254-8438 🏢 Rhodes Hall, room 194

Office Hours: (two hours each week, TBA), or by appointment, in Rhodes 194.

Remote meetings (on Zoom or by telephone) are possible by appointment.

To schedule an appointment, please email Amber DeJesus, Administrative Assistant to the Bovay Program: amberdejesus@cornell.edu

Appointments are not required to visit in-person during posted office hours.

Course Learning Outcomes

After completing this course, students will:

1. Be familiar with and able to identify a range of ethical and social issues in professional and academic engineering practice.

2. Understand some of the major normative theories in philosophy, science and technology studies, feminist theory, and other approaches.

3. Be able to apply normative theories to specific cases in engineering, from a variety of different stakeholder perspectives, including the perspectives of historically marginalized social groups.

4. Be able to analyze, evaluate, and produce normative arguments using evidence and techniques of philosophical reasoning.

5. Have improved their research skills and written communication skills, particularly in argumentative/persuasive writing.

Course Schedule

The course is divided into three main parts:

1. **Professional Ethics**. In this part, we consider ethical aspects of the history of engineering, its status as a profession, ethical and social implications of being a professional, and some professional issues that commonly arise in engineering practice.

2. **Philosophical Ethics**. In this part, we learn from several major theories of ethics in philosophy, and how they can help us to understand different approaches to doing engineering responsibly.

3. **Topics in Engineering Ethics**. In this part, we discuss specific ethical and social issues that arise in connection with a wide range of engineered technologies and systems, from bridges to telecommunications to gene therapy.

These main parts are occasionally interrupted by writing workshops, where students will discuss their essay projects with one another.

The table below provides the schedule for the term, listing each class's date, topic, and assigned reading. The schedule is subject to change in the event of unanticipated university closures or other appropriate circumstances; all changes to the schedule will be announced on the course website.

Unit	Date	Topic	Reading
Introduction	M Jan 22	Introduction	—
	W Jan 24	Engineering and Social Power	Alexander, A Brief History of Engineering
	M Jan 29	Politics of Technology	Winner, Do Artifacts Have Politics?
Professional Ethics in Engineering	W Jan 31	Engineering as a Profession	Taebi, ch. 1
	M Feb 5	Professional Codes of Ethics	NSPE Code
	W Feb 7	Diversity, Equity, and Inclusion in the Engineering Profession	Franzway et al., Engineering Ignorance
	M Feb 12	Responsible Innovation	Taebi, ch. 4
	W Feb 14	Engineering in a Global Context	Taebi, ch. 7
	M Feb 19	Whistleblowing	Bok, The Morality of Whistleblowing
	W Feb 21	Writing Workshop	How To: Researching for Essays
	M Feb 26	February Break (no class)	
Philosophical Perspectives	W Feb 28	Justice & Consumer Rights	Larsen & Lawson, Consumer Rights
	M Mar 4	Consequences & Cost-Benefit Analysis	Taebi, ch. 3
	W Mar 6	Duties & Risk Assessment	Taebi, ch. 2
	M Mar 11	Bad Character or Bad Circumstances?	Stovall, Professional Virtue and Professional Self-Awareness
	W Mar 13	Automating Care	Parks, Lifting the Burden of Women's Care Work
	M Mar 18	Writing Workshop	How To: Refining Arguments

	W Mar 20	Designing for Human Capabilities, Not for Disability	Shew, *Against Technoableism* (selection)
	M Mar 25	African Perspectives on Human Genome Editing	Shozi & Thaldar, Promoting Equality in the Governance of Heritable Human Gene Editing through Ubuntu
	W Mar 27	Ethical Considerations of Working with First Nations, and Indigenous Ethical Systems	Dimayuga et al., A review of collaborative research practices with Indigenous Peoples in engineering
	M Apr 1	Spring Break (no classes)	
	W Apr 3		
Cases in Engineering Ethics	M Apr 8	Smart Cities	Ziosi et al., Smart Cities
	W Apr 10	Large System Reliability	Busby et al., Understanding the 2021 Winter Blackout in Texas
	M Apr 15	Sustainability & Energy	Taebi, ch. 6
	W Apr 17	Telecommunications & Digital Divides	Reglitz, The Human Right to Free Internet Access
	M Apr 22	Geoengineering	Blomfield, Geoengineering in a Climate of Uncertainty
	W Apr 24	Privacy & Facial Recognition	Hill, *Your Face Belongs to Us*, selection
	M Apr 29	Machine Ethics	Taebi, ch. 5
	W May 1	Cloning	Baylis, Human Cloning
Conclusion	M May 6	Mini-Symposium	Another student's essay

Other Important Dates

- February 5: Last day to **add** courses
- March 18: Last day to **drop** courses without a "W," or to change **grade options**
- May 8–10: **Study Days**
- May 11–18: **Exams**

Assignments

Weekly Quizzes (1% × 15 = 15%)

Due Fridays. Every week, there will be a short quiz (3–5 questions). These quizzes are online (on Canvas) and open-book, with a 15-minute time limit and no retries. Questions will be based on the week's assigned readings, and may ask about details not specifically covered in class.

These questions may take a variety of formats (e.g. multiple choice, multiple select, true or false, matching, fill-in-the-blank, short answer, etc.). Quizzes become available each Monday at 6:00 AM, and must be completed by Friday at 7:00 PM. Solutions will be available online in the week following the quiz, and at office hours thereafter.

Reading Journals (2% × 5 = 10%)

Due Weekly (see text). You will write several single-page pieces (about 250 words each) reflecting on the course readings. Each journal entry must respond to one of the following prompts; you must use each prompt once and may not use a given prompt more than twice:

1. Explain how one of this week's readings connects with your own views or experiences, particularly whether it supported, challenged, or changed some of your opinions.

2. Develop an argument against a view presented in one of the readings.

3. Raise and respond to an objection to a view presented in one of the readings.

4. Apply one of the readings to a case or example not covered in class or in the reading (use your own research or speculate about a hypothetical scenario).

5. Explain how one of the readings from this week complicates or supports a view presented in an earlier week's reading.

You may submit a journal entry in response to any week's readings by the Friday of the same week the reading is assigned. You may submit up to six journal entries over the course of the term, but only your five best submissions will count. (Additional submissions after the sixth are welcome but will not be graded.)

Essay Proposal (15%)

Due Friday, March 15. Write 2-page (about 500 words) description of the essay you plan to write. The topic is open, but should concentrate on an ethical issue that arises with regard to the profession of engineering, the social effects of engineered technologies, or some other aspect of the ethics of engineering. Your proposal should briefly describe the ethical problem or case you plan to discuss, give a summary of the facts needed to understand the topic, and sketch some possible arguments you might make. You will share your essay proposal with a group of peers for in-class discussion of how to develop and improve your arguments.

Essay (30%)

Due Friday, May 3. Expanding upon your proposal, write an essay (approximately 1,250 words or 5 pages). Your essay should provide sufficient descriptive detail for a non-specialist reader to understand the topic, and defend a normative view on it, considering potential objections and alternative perspectives. You will share your final paper with a group of peers for in-class discussion.

Final Exam (30%)

The final exam will be held in the usual exam period. It will be scheduled for three hours. There will be two sections: The first section will have 20 questions drawn directly from the weekly quizzes (0.5 points each = 10 points total). The second section will be an essay in response to a prompt; two prompts will be provided to choose from, which in turn will be drawn from a superset released several weeks in advance of the exam (20 points).

Bibliography of Readings

Alexander, Jennifer Karns. "A Brief History of Engineering." In *The Routledge Handbook of the Philosophy of Engineering*, edited by Diane P. Michelfelder and Neelke Doorn, 25–37. New York & London: Routledge, 2020.

Baylis, Françoise. "Human Cloning: Three Mistakes and an Alternative." *The Journal of Medicine and Philosophy* 27, no. 3 (June 1, 2002): 319–37. https://doi.org/10.1076/jmep.27.3.319.2984.

Blomfield, Megan. "Geoengineering in a Climate of Uncertainty." In *Climate Change and Justice*, edited by Jeremy Moss, 39–58. Cambridge: Cambridge University Press, 2015. https://doi.org/10.1017/CBO9781316145340.003.

Bok, Sissela. "The Morality of Whistleblowing." In *Computers, Ethics, and Society*, 3rd ed., edited by M. David Ermann and Michele S. Shauf, 47–54. New York and Oxford: Oxford University Press, 2003. Excerpted from: Bok, Sissela, *Secrets: On the Ethics of Concealment and Revelation*, New York: Pantheon, 1982.

Busby, Joshua W., Kyri Baker, Morgan D. Bazilian, Alex Q. Gilbert, Emily Grubert, Varun Rai, Joshua D. Rhodes, Sarang Shidore, Caitlin A. Smith, and Michael E. Webber. "Cascading Risks: Understanding the 2021 Winter Blackout in Texas." *Energy Research & Social Science* 77 (July 1, 2021): 102106. https://doi.org/10.1016/j.erss.2021.102106.

Dimayuga, Pia, Shakya Sur, Alex Choi, Heather L. Greenwood, Tracey Galloway, and Amy M. Bilton. "A Review of Collaborative Research Practices with Indigenous Peoples in Engineering, Energy, and Infrastructure Development in Canada." *Energy, Sustainability and Society* 13, no. 1 (January 31, 2023): 3. https://doi.org/10.1186/s13705-023-00382-8.

Franzway, Suzanne, Rhonda Sharp, Julie E. Mills, and Judith Gill. "Engineering Ignorance: The Problem of Gender Equity in Engineering." *Frontiers: A Journal of Women Studies* 30, no. 1 (2009): 89–106.

Hill, Kashmir. *Your Face Belongs to Us: A Secretive Startup's Quest to End Privacy as We Know It*. New York: Penguin Random House, 2023.

Larsen, Gretchen, and Rob Lawson. "Consumer Rights: An Assessment of Justice." *Journal of Business Ethics* 112, no. 3 (2013): 515–28.

National Society of Professional Engineers. "Code of Ethics," July 2019. https://www.nspe.org/resources/ethics/code-ethics.

Parks, Jennifer A. "Lifting the Burden of Women's Care Work: Should Robots Replace the 'Human Touch'?" *Hypatia* 25, no. 1 (2010): 100–120.

Reglitz, Merten. "The Human Right to Free Internet Access." *Journal of Applied Philosophy* 37, no. 2 (2020): 314–31. https://doi.org/10.1111/japp.12395.

Shew, Ashley. *Against Technoableism: Rethinking Who Needs Improvement*. New York: W. W. Norton, 2023.

Shozi, Bonginkosi, and Donrich Thaldar. "Promoting Equality in the Governance of Heritable Human Genome Editing through Ubuntu: Reflecting on a South African Public Engagement Study." *The American Journal of Bioethics* 23, no. 7 (July 3, 2023): 43–49. https://doi.org/10.1080/15265161.2023.2207524.

Stovall, Preston. "Professional Virtue and Professional Self-Awareness: A Case Study in Engineering Ethics." *Science and Engineering Ethics* 17, no. 1 (March 2011): 109–32. https://doi.org/10.1007/s11948-009-9182-x.

Taebi, Behnam. *Ethics and Engineering: An Introduction*. Cambridge: Cambridge University Press, 2021.

Winner, Langdon. "Do Artifacts Have Politics?" *Daedalus* 109, no. 1 (1980): 121–36.

Ziosi, Marta, Benjamin Hewitt, Prathm Juneja, Mariarosaria Taddeo, and Luciano Floridi. "Smart Cities: Reviewing the Debate about Their Ethical Implications." *AI & Society*, September 30, 2022. https://doi.org/10.1007/s00146-022-01558-0.