

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.

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

Cross-listed and/or held with: PHIL 2471 (no. 19866), STS 3601 (no. 7614)

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: Mondays & Wednesdays, 2:55 PM to 4:10 PM, Phillips 213, Jan 22 to May 7.

Course website: <https://canvas.cornell.edu/courses/63007/>

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, Senior Lecturer (by courtesy) in Philosophy, Director of the Bovay [Program in the History & Ethics of Professional Engineering](#).

✉ tsgoetze@cornell.edu

☎ [607-254-8438](tel:607-254-8438)

🖥 [Click for Zoom](#)

🏢 [Rhodes Hall 194](#)

In-person office hours: Mondays 1:00–2:00 PM in Rhodes 194.

Virtual office hours: Fridays 11:00 AM–12:00 PM via Zoom.

To schedule an appointment, please email Amber DeJesus, Administrative Assistant to the Engineering Ethics 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 Materials

This course has one **required textbook**:

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

The book is available physically through the Cornell Library and the Cornell Store. It is available electronically through the Cornell Library or CAMP.

There are **additional required readings**. You may purchase a coursepack from the Cornell Store, or access the readings electronically through CAMP, Canvas, or the Cornell Library.

From time to time, I will recommend various further readings that you may look up on your own if you are interested in diving deeper on particular topics.

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.

An *asterisk in front of the topic indicates a session where an in-class writing exercise will take place.

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	*The Politics of Technology	Winner, Do Artifacts Have Politics?
Professional Ethics in Engineering	W Jan 31	Engineering as a Profession	Taebi, §§1.1, 1.2, 1.3
	M Feb 5	Professional Codes of Ethics	NSPE Code
	W Feb 7	Diversity, Equity, and Inclusion in Engineering	Franzway et al., Engineering Ignorance
	M Feb 12	Strategies for Ethical Design	Taebi, §§4.1, 4.5, 4.6, 4.8
	W Feb 14	Engineering in a Global Context	Taebi, §§7.1, 7.2, 7.4, 7.5
	M Feb 19	*Whistleblowing	Bok, The Morality of Whistleblowing
	W Feb 21	Library Workshop	TBD
	M Feb 26	February Break (no class)	

Philosophical Perspectives	W Feb 28	Professional Virtues and Vices	Stovall, Professional Virtue and Professional Self-Awareness, pp. 120–28
	M Mar 4	Consequentialism & Cost-Benefit Analysis	Taebi, ch. 3, §§3.1, 3.2, 3.3
	W Mar 6	Duties & Risk Analysis	Taebi, ch. 2, §§2.1, 2.2, 2.3, 2.5
	M Mar 11	Justice & Consumer Rights	Larsen & Lawson, Consumer Rights: An Assessment of Justice, pp. 516–21
	W Mar 13	Automating Care	Parks, Lifting the Burden of Women’s Care Work, pp. 102–112
	M Mar 18	*Writing Workshop	TBD
	W Mar 20	Accessibility Design from Disabled Perspectives	Shew, <i>Against Technoableism</i> (Chapter 6: Accessible Futures)
	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			
W Apr 3			
Spring Break (no classes)			
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, The Technology Facebook and Google Didn't Dare Release
	M Apr 29	Machine Ethics	Taebi, ch. 5
	W May 1	*Cloning	Baylis, Human Cloning
Symposium	M May 6	Final Projects	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

Your assignments contribute to your final grade as follows:

- Quizzes: 1% each $\times 14 = 14\%$
- Reflections: 1% each $\times 6 = 6\%$
- Project Proposal: 15%
- Project Presentation: 5%
- Project Paper: 30%
- Final Exam: 30%

Assignment descriptions follow.

Weekly Quizzes (1% $\times 14 = 14\%$)

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 no later than Friday at 9:00 PM. Solutions will be available online in the week following the quiz, and at office hours thereafter.

Reflection Journals (1% $\times 6 = 6\%$)

Periodically throughout the term, we will take fifteen minutes of class time to reflect on what we've read and discussed over the last few weeks. You will capture your thoughts in a hand-written journal, using no electronic aids.

Project 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.

Project Paper (30%)

Due Friday, April 19. Expanding upon your proposal, write a short essay (1,000–1,250 words or 4–5 pages in a standard 12-point double-spaced font). 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.

Project Presentation (5%)

In-class, Monday, May 6. You will share your essay's arguments with the class at the symposium in the final session of the course. Produce a poster that highlights your arguments and conclusions. Be prepared to speak for approximately five minutes and to answer questions from your peers and members of the Cornell community. You will evaluate two projects by your peers; part of your grade will be tied to your engagement with the peer evaluation exercise.

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).

Course Policies

The following policies govern this course, in addition to the policies of the university.

Communicating with the Instructor

Please use **email** for all routine course-related matters. I will respond more quickly if you include the course number in the subject line. Please ensure that you use your Cornell email address, to reduce the likelihood of being caught in a spam filter. NB: I do not check or reply to email on weekends and university holidays.

Please call my office **phone** only for urgent matters, such as an emergency accommodation or to cancel an imminent appointment.

My **office hours** listed above are open drop-in times; appointments are not required if you visit during these hours. You are also welcome to email me to schedule an appointment outside of these hours. You may come to office hours to discuss anything related to the course, including catching up on material you may have missed due to illness, asking questions about course material, receiving detailed feedback on written work, and so on.

Academic Integrity

It is your responsibility as a member of the university to be familiar with and to follow the Code of Academic Integrity: <https://theuniversityfaculty.cornell.edu/dean/academic-integrity/code-of-academic-integrity/>

Each student in this course is expected to abide by the Cornell University Code of Academic Integrity. Any work submitted by a student in this course for academic credit must be the student's own work.

Students agree that by taking this course, all required papers may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers

will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Usage Policy posted on the Turnitin.com site.

If you are unsure about what constitutes a violation of the Code of Academic Integrity, or about any other issue related to academic integrity, please ask the instructor.

Regarding particular assessments, violating any of the following policies will be considered inconsistent with the Code of Academic Integrity:

- Collaboration on **quizzes** is not permitted.
- Informal discussion of your **written assignments** with others, including Writing Center tutors, is encouraged. Substantive collaboration, such as trading off sections to co-author or line-by-line content editing, is not permitted. Hiring third-party tutors (i.e., tutors not acting under an affiliation with a Cornell academic support service) is strongly discouraged, as they are less familiar with the Code of Academic Integrity and put you at risk of an unwitting violation. If another person writes any portion of work that you submit for these assignments, that is plagiarism.
- Collaboration during the **exam** is not permitted. Group studying before the exam, including brainstorming ideas for the essay portion and critiquing practice essays, is encouraged. The exam is closed-book, and no electronic devices of any kind are permitted, except for accessibility devices.
- Unauthorized use of **generative artificial intelligence** will be treated as an academic integrity violation. See below.

For additional guidance, please consult the following sources:

- Provost's Guide to Academic Integrity at Cornell:
https://provost.cornell.edu/_files/faculty-resources/essential-guide-academic-integrity.pdf
- Library Guide to Academic Integrity:
<https://guides.library.cornell.edu/c.php?g=31932&p=202032>
- College of Arts & Sciences guide for avoiding plagiarism:
<https://plagiarism.arts.cornell.edu/tutorial/index.cfm>
- Information on Academic Integrity hearings:
<https://theuniversityfaculty.cornell.edu/dean/academic-integrity/guidelines-for-students/>

Use of Generative Artificial Intelligence

Generative AI technologies are applications that use machine learning to produce text or other content in response to a user-input prompt. Text-generating examples include ChatGPT, Bing, and Bard. These tools are essentially random generators that are carefully weighted to produce text with an appearance of (semi-)coherent thought. They have their uses, but I am deeply skeptical of their value in academic contexts.

The university has no official stance on generative AI. My view as an instructor is that using generative AI is a shortcut that undermines your learning and misrepresents your abilities and achievements. Submission of work wholly generated by AI does not reflect your abilities at all; submission of partially AI-generated work, or AI-generated work that has been edited, is not much better, and comparable to having a friend write the first draft for you. I am interested in reading how *you* think through ethical problems and make *your own* judgements about them, not in what a machine learning model trained on the contents of the World Wide Web predicts that someone might write. The only appropriate academic use case of these technologies, in my view, is brainstorming aids. However, given these models' tendency to make things up (i.e. to "hallucinate"), including references to non-existence sources, I am doubtful of their usefulness here as well.

My policy is this: Use of generative AI as an aid in producing your work is permitted, but ***no content produced by an AI application may be submitted as your own work***, unless you have received prior explicit written permission from me.

Suspected violation of this policy will be treated as inconsistent with the Code of Academic Integrity, particularly the student's responsibilities not to misrepresent their work (I.A.1.) and not to fraudulently or unfairly advance their academic position (I.A.2.), and will result in a primary hearing. See the links above for information on this procedure.

Attendance and Participation

There is no grade attached to attendance or participation. Showing up and taking part in class activities is not rewarded in this course; it is simply expected as part of your commitment to achieving the learning outcomes. Students are responsible for making up for material they may have missed in preparation for assessments, either by coming to office hours or through additional study. Notifying the instructor of an absence is appreciated but not required, and no medical documentation is necessary.

Late Assignments & Extensions

Because all assessments apart from the final exam are submitted electronically, you are advised to submit them in advance on the posted deadline. Computer systems can slow down or fail unexpectedly, potentially putting you in an awkward position.

Late quizzes cannot be accepted. Where extenuating circumstances exist, a missed quiz may be exempted from your final grade; please write to the instructor within one week of the quiz deadline to request an exemption.

Late written assignments will be penalized by -5% to the base grade per day late, up to a maximum of five days. (An assignment is late by 1 day at midnight after the deadline, increasing by 1 day every time the clock strikes midnight thereafter.) Essays more than five days late will receive a grade of zero unless there exceptional circumstances are brought to the instructor's attention.

If you require an **extension on a written assignment**, please write to the instructor in advance of the deadline, explaining the extenuating circumstances and proposing an alternative deadline. The instructor will review your request, and may ask follow-up questions. Making a request does not guarantee receiving an extension.

If you require an **alternative time for the final exam**, you must contact the instructor well in advance to schedule it. If you miss your scheduled exam time (whether the official time or a make-up time), you will receive a grade of zero on the exam.

The above policies in this subsection may be overridden by accessibility accommodations, where appropriate. You must contact Student Disability Services to make an accessibility plan *before* contacting me about your accessibility needs with regard to assessments. See below for more information on accessibility.

Grading Practices

Auditing the course is not permitted. This course uses letter grades as defined by the [Cornell Grading System](#). Students who change grade options after the first day of classes should inform the instructor immediately. As specified in university policy, this choice must be made by the 57th calendar day of term. Students interested in the S/U option are responsible for ensuring that this choice will not interfere with any academic requirements they wish to have this course counted towards. Students should consult their academic advisor and familiarize themselves with the rules in the [Engineering Undergraduate Handbook](#) (see especially pages 144–5), or the appropriate handbook for their major, college, or school, when considering the S/U option.

Instructions for assessments will specify the maximum number of points earnable for that assessment, and how much each component of the assessment is worth towards that total. Written assignment instructions will be accompanied by the rubric that will be used in grading.

Grades will be calculated as a score out of 100 (rounded to the nearest whole number) and converted to a letter grade using the following table:

A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
96–100	93–95	90–92	86–89	83–85	80–82	76–79	73–75	70–72	66–69	63–65	60–62	0–59
S									U			

The instructor reserves the right to adjust final grades using a bell curve if they believe that doing so would more accurately reflect student achievement. This decision, if made, will be explained in writing. I see this as an extreme measure and will only take it if I have substantial concerns about the cohort's grades.

Accessibility

Your access in this course is important to me. While I try to make my courses as accessible as I can by design, I understand that accommodations may be necessary. If you identify an accessibility need for yourself, please consult with Student Disability Services (SDS) on your next steps as soon as possible. In general, I will only act on accessibility requests that come via the SDS process.

Please request your accommodation letter early in the semester, or as soon as you become registered with SDS, so that we have adequate time to arrange your approved academic accommodations.

- Once SDS approves your accommodation letter, it will be emailed to both you and me. Please follow up with me to discuss the necessary logistics of your accommodations.
- If you are approved for exam accommodations, please consult with me at least two weeks before the scheduled exam date to confirm the testing arrangements.
- If you experience any access barriers in this course, such as with printed content, graphics, online materials, or any communication barriers, reach out to me or SDS right away.
- If you need an immediate accommodation, please speak with me after class or send an email message to me and SDS at sds_cu@cornell.edu.

You never need to disclose the nature of your disability to me, only your needed accommodations.

If you have or think you may have a disability, please contact Student Disability Services for a confidential discussion: sds_cu@cornell.edu, 607-254-4545, <https://sds.cornell.edu>.

Sources of Support

The following services are available to you if you require support.

Writing Skills

Students requiring additional guidance with writing assignments are encouraged to consult the following resources:

- The instructor, via email or office hours
- The Cornell Writing Centers: <https://knight.as.cornell.edu/wc>
- Supplemental writing guides posted on Canvas

Student Disability Services

<https://sds.cornell.edu/>

Mental Health

<https://mentalhealth.cornell.edu/>

Student Support & Advocacy

<https://scl.cornell.edu/student-support>

Library Help

<https://www.library.cornell.edu/get-help/>

Centers for Equity, Empowerment, and Student Belonging

Cornell takes its mission of being a place “where **any person** can find instruction in any study” seriously. The following resource centers and services exist to help you succeed here.

- Cornell University Diversity & Inclusion: <https://diversity.cornell.edu/>
- Asian & Asian American Center: <https://scl.cornell.edu/a3c>
- Black Student Empowerment: (coming soon)
- First Generation and Low-Income Student Support: <https://scl.cornell.edu/first-generation-low-income-support>
- Gender Equity Resource Center: <https://scl.cornell.edu/GenEq>
- Latinx Student Empowerment: (coming soon)
- LGBT Resource Center: <https://scl.cornell.edu/LGBTRC>
- Office of Spirituality and Meaning-Making: <https://scl.cornell.edu/osmm>
- Undocumented/DACA Student Support: <https://scl.cornell.edu/identity-resources/undocumented-daca-support>
- Confidential Support: <https://titleix.cornell.edu/resources/confidential/>
- Report an incident or concern: <https://scl.cornell.edu/report-incident-or-concern>
- University Ombuds: <https://ombuds.cornell.edu/>

Updates and additions to this list will be posted here: <https://scl.cornell.edu/belonging-support-services/centers-student-equity-empowerment-and-belonging>

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