

Writing Assignments

The Need for Good Engineering Writing

Engineering 183EW and 188EW require a good amount of writing, possibly more than you have experienced before. We do this because engineers are expected to write in their professional capacities all through their careers. Bower (1985), in an MIT thesis on technical communication within the industrial community, determined that an entry-level engineer will spend approximately one third of his or her time writing or preparing to write (reading background material, etc.), and the percentage of time devoted to writing only increases with increasing responsibility within an engineering organization.

Bower provides the following quotations about the necessity of communication skills within the engineering community:

“New employees with good writing skills do not waste productive time learning the basics on the job.”

“Well-written reports increase an employee’s visibility and chances of recognition.”

“The quality of a communication had a strong impact on an idea’s reception and implementation.”

“Well written documents increase a company’s image and prestige.”

“Writing ability often correlates with a superior manager’s characteristics, such as the capability to synthesize and clarify in complex situations.”

“The quality of communication has a strong impact on an idea’s reception.”

“Poor proposals and reports mean little or no future work with clients.”

“Young engineers who write with clarity and make logical presentations tend to become supervisors of other engineers within 5 years of graduation.”

“A person got more visible work done because she finished reports quickly, leaving more time for other work.”

“Oral skills are more important to ‘power seekers,’ but good writing helps the few craftsmen who are left.”

“A man was forced to resign because the research reports he wrote were poor, even though the quality of his work was very good.”

Engineering employers have indicated, on a nationwide scale, that the present generation of engineering graduates comes unprepared to write within the workplace. Theodore C. Kennedy, a practicing engineer, noted the following in an address before a meeting of the National Academy of Engineering in Washington, D.C. (Kennedy, 2006):

We have to change what we expect from engineers, and we have to turn out graduates with broader skills, interests, and abilities. With the commoditizing of basic design engineering and the migration of that function overseas, the traditional training ground for recent graduates is no longer available in the United States. Young engineers now have to move up to design leader and managerial positions much faster. The learning curve is getting steeper.

When I hire someone today, I look for different skills than I did 10 years ago. Today,

it is not unusual for good candidates to have global references and experience on projects and assignments around the world. I think we must prepare our graduates for that type of career, because they aren't likely to spend their careers working in one company, or even in one country. And they must become advisors, consultants, managers, and conceptual planners much more quickly than they did a few years back.

This is true even for my business in the smokestack industries. Today, I need Georgia Tech, the University of Texas, and other educational institutions to turn out graduates who are mature and have more than professional engineering skills. I need graduates who know something about working with others—not just teamwork, which is a given—but a basic understanding that our culture is not the only one around. I need graduates who can speak before an audience to make a point, either to me or to a client. Comfortable or not, engineers today are constantly selling—selling an idea, a concept, a study, an alternative, or just the need for a new document-control system.

Engineers must be prepared to write reports, studies, or routine business letters better than most can today. I have largely given up on teaching engineers to write succinctly, concisely, and clearly. I am tired of cite, sight, and site being used interchangeably. I used to send my engineers to classes, but now I have a report review team of English majors. And the situation has gotten worse with the advent of e-mail. Now we don't even write in complete sentences.

But, most important, I want employees who can analyze—analyze problems, situations, ramifications, upside and downside, near-term and long-term effects. The ability to analyze is a defining quality of new hires and of the employees I retain. I want my employees to ask the next questions: “Why is that so? Are you sure? What fact is that based on?”

We'll give the final word on the importance of writing to Randy Cohen, who for many years wrote “The Ethicist” column in the *New York Times Magazine* every Sunday.

I prescreen job applicants for a small engineering consulting firm committed to equal opportunity. These jobs are primarily technical, but English-language skills are required for the technical writing involved, and a writing sample is requested. Many applications are full of errors in grammar, spelling and punctuation, and are summarily rejected. This disproportionately affects applicants whose names suggest that English may be their second language, as well as other minority groups. Is it ethical to reject engineering applicants for their writing skills? J.W., PENNSYLVANIA

Because clear and accurate writing is a significant part of the job, it is legitimate to eliminate applicants who demonstrate an inability to provide it. But don't stop there.

Your admirable commitment to equal opportunity can be reconciled with your determination to maintain high professional standards. There is no shortage of minority candidates with good writing skills; you should make sure those folks are aware of this job opening by broadening your search to take in, for example, historically black colleges and universities. You can reach out to organizations

involved in training and finding jobs for those for whom English is a second language. You can recruit women, sometimes underrepresented in engineering firms. You can help lower-level employees within your own organization gain the skills they need to advance. In addition, if you do reject an otherwise qualified person because his English-language skills are deficient, let him know why, so he has a chance to improve (and not waste his time buffing up his mastery of tango or knitting). What's crucial is that you are not passive — responding only to those who happen to apply for this job — but take steps to honor both of your laudable values.

UPDATE: After posting on engineering-employment Web sites directed to women, African-Americans and Hispanics, the company found a hire through a more general site, Craigslist. His surname did not announce him as Hispanic, but he turned out to be so and to be bilingual, an asset in this job (Cohen, 2010).

4.2 Individual Writing Assignments

We give two individual writing assignments in Engr 183EW and 188EW; they are:

1. Analysis of current techno-societal issue, assigned the 1st week.
2. Selected ethical case study, assigned the 4th week.

The student is expected to submit a double-spaced essay of 11 pt type for each assignment. The expected length is discussed in each assignment. The student should read the actual assignment carefully before beginning work.

4.2.1 Purpose

The main purpose of the two individual essay assignments is to evaluate and improve the student's ability to communicate effectively in writing -- a skill essential for engineers at all professional levels and in all technical areas. Practice in oral communication is provided by the Team research oral presentation.

In addition, the individual essays are intended to demonstrate an understanding of professional and ethical responsibility. For example, the writing assignments require discussion of ethical issues resulting from a specific current event and an engineering ethics case study of the student's choosing, respectively.

4.2.2 The Revision Process & Grading

Each individual paper should be prepared as you would if you were a professional engineer submitting a paper to an employer or a technical journal. Your teaching assistant will review the paper as if he or she was a peer reviewer for a technical journal, substituting our grading criteria (see the grading matrices on the following pages) for a technical review. The paper will be given a conditional grade. In addition, if in the opinion of your teaching assistant your paper does not reflect a professional level of preparation (such as the paper consisting only of an outline with no supporting reference material), the teaching assistant may reject the paper summarily. In this case, it is up to the TA's discretion whether a revised paper will be accepted; if one is accepted, the TA may grade the resulting paper lower than if it had been submitted in a timely manner. An individual writing assignment may be returned to the student for rewriting if any element of the essay is determined to be below the standards that we expect of UCLA students.

Upon the return of the paper to you, you should revise the paper in accordance with the TA's suggestions. If a significant amount of effort was expended in preparing the paper in the first place, revisions may be minimal. If not, a significant rewrite may be necessary.

On the submission of the revised paper, your teaching assistant will assign a final grade to the revised paper.

4.2.3 Guidance and Grading

As with virtually all of the course assignments, grading is based on multiple criteria:

- Did the student address the actual question or issue at hand?
- Is the answer well organized and complete? If there are sub-sections, are all of these identified and covered?
- Is the essay logically and competently written? Is the student's point of view clearly expressed? Is the writing grammatical and free of spelling and other errors?
- Are there a sufficient number of references (where these are required) and are they of sufficiently high quality? As Engr 183EW and 188EW are upper division classes, we expect research-quality references, not one and two page web pages written for seventh grade students. Papers without or with insufficient references will not be reviewed or graded.
- Does the essay show original and/or creative thought?
- Is the presentation professional looking and confidence building?

Typical evaluation matrices are included on the following pages.

Evaluation Rubric for Science and Technology Essay

Rating Scale:

- 4 = Excellent: *outstanding, inspired* thought and/or communication—far beyond merely adequate.
- 3 = Good: sufficient in all criteria but not extraordinary; very few errors of reasoning or written expression.
- 2 = Fair: meets the basic expectations for the assignment, but there are often problems with the argument, reasoning, structure, and/or writing.
- 1 = Poor: barely meets the most basic expectations for the assignment; shows only a slight semblance of coherence in structure, argument, and written expression.
- 0 = Completely unacceptable: fails to demonstrate basic expectations for or even understanding of the assignment.

Grading Criteria	Rating (0-4)
Introduction / Thesis <ul style="list-style-type: none"> Introduction contains the problem statement and thesis; provides sufficient background material; defines important terms; orients reader to the rest of the paper. Clearly stated thesis outlines topic focus and analysis/argument. <p>Thesis serves as the controlling idea for the rest of the paper.</p>	
Adhered to the Assignment <ul style="list-style-type: none"> Clear and concise summary of the problem Concepts from ethical frameworks are chosen appropriately and explain clearly. Ethical concepts are used to analyze and understand the specific problem. <p>Presents possible solutions, again using concepts from ethical frameworks as an analytical tool. These exhibit critical, creative, and rational thinking.</p>	
Research / Sources <ul style="list-style-type: none"> <i>Relevant</i> sources are used appropriately— i.e., to reinforce a point the writer is making or to provide background and context on the case. Summaries/paraphrases/quotes of sources are well-integrated with the rest of the paper (i.e., smoothly presented and commented upon). <p>All research is cited appropriately in the text using the correct format (i.e., parenthetical citation) and all sources are in the correct format in the References List.</p>	
Organization / Exposition <ul style="list-style-type: none"> Paper is logically and intelligently organized to fit the progression of the argument. Paragraphs have clear, focused points that support the argument of the exploration of the problem. Paragraphs are well-developed—they advance the argument by making good claims, using good evidence, and commenting on the significance of the evidence to support the claims. <p>Sentences, paragraphs, and sections of the paper progress logically and smoothly to build the argument.</p>	
Conclusion <ul style="list-style-type: none"> Summarizes argument and main points while avoiding redundancy. Provides closure to the paper and makes reader aware of the broader context of the paper's discussion. <p>Answers the question of why the argument matters.</p>	
Grammar / Style <ul style="list-style-type: none"> Paper is highly readable—sentences and paragraphs are clear and concise; word choice is precise. <p>Paper is free of serious problems with grammar, punctuation, or spelling that might disrupt communication between the reader and the writer.</p>	

Evaluation Rubric for Ethical Case Study Postmortem

Rating Scale:

- 4 = Excellent: *outstanding, inspired* thought and/or communication—far beyond merely adequate.
- 3 = Good: sufficient in all criteria but not extraordinary; very few errors of reasoning or written expression.
- 2 = Fair: meets the basic expectations for the assignment, but there are often problems with the argument, reasoning, structure, and/or writing.
- 1 = Poor: barely meets the most basic expectations for the assignment; shows only a slight semblance of coherence in structure, argument, and written expression.
- 0 = Completely unacceptable: fails to demonstrate basic expectations for or even understanding of the assignment.

Grading Criteria	Rating (0-4)
Introduction / Thesis <ul style="list-style-type: none"> Introduction contains the problem statement and thesis; provides sufficient background material; defines important terms; orients reader to the rest of the paper. Clearly stated thesis outlines topic focus and ethical argument. Thesis serves as the controlling idea for the rest of the paper. 	
Adhered to the assignment <ul style="list-style-type: none"> Comprehensive and clear analysis of the major issues surrounding the engineering failure. Thorough discussion of available courses of action and constraints on decision-makers. Highlights ethical issue(s) involved in the case. Explains and clearly applies appropriate ethical principle to the case. Presents possible solutions that exhibit critical, creative, and rational thinking. 	
Research / Sources <ul style="list-style-type: none"> <i>Relevant</i> sources are used appropriately—i.e., to reinforce a point the writer is making or to provide background and context on the case. Summaries/paraphrases/quotes of sources are well-integrated with the rest of the paper (i.e., smoothly presented and commented upon). All research is cited appropriately in the text using the correct format (i.e., parenthetical citation) and all sources are in the correct format in the References List. 	
Organization / Exposition <ul style="list-style-type: none"> Paper is logically and intelligently organized to fit the progression of the argument. Paragraphs have clear, focused points that support the argument of the exploration of the problem. Paragraphs are well-developed—they advance the argument by making good claims, using good evidence, and commenting on the significance of the evidence to support the claims. Sentences, paragraphs, and sections of the paper progress logically and smoothly to build the argument. 	
Conclusion <ul style="list-style-type: none"> Summarizes argument and main points while avoiding redundancy. Provides closure to the paper and makes reader aware of the broader context of the paper's discussion. Answers the question of why the argument matters. 	
Grammar / Style <ul style="list-style-type: none"> Paper is highly readable—sentences and paragraphs are clear and concise; word choice is precise. Paper is free of serious problems with grammar, punctuation, or spelling that might disrupt communication between the reader and the writer. 	

Descriptions of the two writing assignment are:

Writing Assignment 1 – Essay on Technology and Society

Drafts, Due Dates, Lengths, File Format

- Topic Proposal (approx. 300 words). Due via email to your TA by Friday, 5:00pm (PST), of Week 1.
- First draft: approximately 1750 words (not including the list of references); due in discussion section Week 3; also upload to Turnitin via the link on BruinLearn. **Please note that the draft must include correct citations of sources and a preliminary list of references) for all works cited in the draft. (See separate document listing reference formats.)**
- Final version: 2500 words or more (not including the list of references); due in discussion section Week 5; also upload to Turnitin via the link on BruinLearn.
- **File Format: Please compose ALL your drafts using Google Docs only. This will make it easier to share your files with others for peer review and for your TA to make comments.**

Picking a Topic and Narrowing Your Focus

Your task is to write a paper exploring the broader societal issues surrounding a technology topic. Choose one of the following topic areas:

- Artificial intelligence and robotics
- Drought mitigation technologies
- Election technologies
- Environmental pollution and energy technologies
- Gig Economy Technologies
- Global warming mitigation technologies
- Medical technologies and Bioengineering
- Space exploration
- Surveillance technologies
- Transportation technologies

Please note that these are broad topic areas, not topics in themselves. Depending on the topic area you are interested in, you will need to carefully narrow the focus of your investigation to something manageable. For example, there are countless possible issues related to artificial intelligence. Do you want to focus on the prospect of artificial intelligence wiping out humanity, as Elon Musk believes is a real threat? Or do you want to focus on how we will deal with the issues of rights for artificial intelligences? (Think, for example, about how we will legally and ethically treat robots that might meet the criteria for sentience.) Or do you want to focus on issues surrounding how to program driverless cars or autonomous weapons to make choices in ethically complicated situations? The more clearly defined and narrow your focus, the more likely your paper is to get off to a strong start.

Proposal

As part of narrowing the focus of your paper, look for a specific debate within your topic. Research and discuss the arguments for and against different positions on the debate (there may be more than just two). Briefly summarize these in your proposal. Ultimately, your goal with the paper is to make an argument yourself about how society should proceed. In the proposal, discuss what argument(s) you would like to make in your essay. Please keep in mind that your argument(s) might change as you do your research and writing; in fact, changing your point of view is a good sign that you've learned something new.

Audience

The paper should be aimed at an audience with science/engineering competency. That said, it is not a technical paper such as might be found in an engineering academic journal. To understand your paper, a reader should not need highly specialized training in a particular discipline of science or engineering. However, you can assume that the reader does have science or engineering experience, though perhaps in an area completely different from the one addressed by the paper.

Structure

Here is a general outline that you should adapt to the individual needs of your topic. Note that some of these sections may overlap.

- **Introduction and problem statement.** Open by defining the topic you're addressing and the debate about the topic. What kinds of social questions are being asked or should be asked about this technology you're discussing? For example, what are the ethical and legal issues raised by this technology? Should there be governmental regulation of this technology or not? What kind? Why?
- 2. **Background.** Draw on your research to provide background information about the topic so that your audience can better understand it. What ethical, legal, and/or environmental debate(s) are currently taking place surrounding this technology?
- 3. **The Technology.** What is the state of the technology now? What promise does it offer? What are its limitations? What problem(s) regarding the technology are you going to focus on? Why? What are the likely consequences of failing to address the problem(s)? How might such problem(s) be overcome?
- 4. **Ethical and Societal Issues.** Describe how the technology raises issues of ethical and/or societal concern. Which groups are affected in which ways? What conflicts among different groups exist?
- 5. **Previously attempted or proposed solutions.** Draw on your research to discuss what has been tried in the past (or has been proposed) to address the problem(s). Have there been technological attempts to solve any problems? Have policies to address the problem(s) been adopted by governments or companies? Analyze the strengths and weaknesses of these attempts/proposals.
- 6. **Recommendations.** What specific action or actions should be taken (by governments, companies, and/or engineers) to help resolve the problem(s)?

Please note that the paper should not simply be a recitation of the relevant facts. Rather, the paper should first frame the issue by describing the factual background and then go beyond that to provide original analysis and identify and explain specific recommended solutions that would help address the problem(s) discussed.

Some Other Possible Questions to Consider

- What are some of the possible intended and unintended effects of this technology?
- How do the unintended effects affect users of this technology?
- How do the unintended effects affect non-users of this technology?
- Do the benefits of the intended effects outweigh the unintended effects?
- What is the role that engineers played in the development of this technology? What ethical responsibilities do those engineers have and why?
- How might engineers eliminate (or decrease) the unintended effects or solve problems related to these effects and promote the more desirable effects?

Research

As you start your research, you may want to aim for at least six (6) really good sources as your foundation. Ultimately, quality of sources is more important than quantity. You should use respected, authoritative sources such as (but not limited to) major news and journalistic sites, respected discipline-specific publications (e.g., *IEEE Spectrum*), peer-reviewed scientific or technical journals, government reports, etc. Here's a short list of some examples of reliable general audience sources:

<i>IEEE Spectrum</i>	<i>New York Times</i>	<i>Aeon</i>
<i>The New Yorker</i>	<i>LA Times</i>	<i>Science</i>
<i>The Atlantic</i>	<i>The Washington Post</i>	<i>Nature</i>
<i>Harper's Magazine</i>	<i>New York Times Magazine</i>	<i>Nautilus</i>
<i>Wired</i>	<i>The Guardian</i>	<i>NewScientist</i>
<i>The Economist</i>	<i>Smithsonian</i>	

These kinds of publications do extensive analysis and discussion of issues rather than simply report news. These are just a few examples; they represent the caliber of publication that you should be using. You can access all of the above (and thousands of others, of course) directly online, but for older articles and more specialized sources the best bet is to use one of the many databases available through the UCLA library website. Also, UCLA librarians can help you find the best studies and articles for your needs. Feel free to ask them for help!

Research Don'ts

You should not use blogs unless you can establish that the blog is widely accepted as authoritative (e.g. something written by an expert in the relevant field). You also should not use most regular news sources (like CNN.com or CBSnews.com or small-town newspapers) or Wikipedia unless it's just as a starting point to find better material. Just remember: your research should be primarily through UCLA library resources; it should not be a collection of random Google hits.

Citations and List of References

Correct documentation style is an essential component of excellent student work. All citations within the text of your paper (in-text citations) and the list of all sources cited at the end of your paper should be documented using the format documented in a separate document posted on BruinLearn.

Like many other citation styles, the Name-Year system requires you to use parenthetical citations (author's name/s and year of publication) at the end of sentences and paragraphs that quote, summarize, paraphrase, or otherwise use information from any source. You should also, where possible, use what is called a "signal phrase" to cite essential information about the source(s) in the lead-up to using research material. For example:

According to a recent Harvard study of civilian deaths and injuries caused by drone-use in warfare, [blah blah blah...] (Henderson et al., 2017).

or:

A U.S. Department of Transportation report details the injuries caused by driverless cars: [blah blah blah...] (US DOT, 2018).

At the end of your paper, include a complete list of References (it should be titled "References") which should list only those sources you've actually cited in your paper.

Please note that ALL DRAFTS (not just the final draft) MUST have all citations and a list of references done correctly. This is to help you keep track of where your information is coming from and also to help your TA identify if there are any problems with the sources of your research.

Writing Assignment 2: Ethical Case Study - Post-Mortem Report

For the second individual writing assignment, we would like you to examine, in detail, an engineering ethics case study. A list of topics is presented below.

The paper should be 2500 words (minimum) in length plus the bibliography, although you are welcome to write more if you wish. Your best beginning sources will probably be the pages of the *New York Times*, the *Los Angeles Times*, and news magazines such as *The Economist* and *Time*. In

some cases, significant papers have appeared in technical journals or books on the older cases. Please see Browne if you're having problems finding material.

A postmortem is a common task in engineering. It formalizes the process of learning from past experience. The post-mortem analyzes a project once it has ended and identifies what went well and what went poorly to improve the next project. This writing assignment asks you to write up a post-mortem of a well-known case of engineering failure, including not only the technical details of the failure but the ethical lapses that contributed to the failure.

The Writing Task -

Your post-mortem write up should explain how ethical lapses contributed to the engineering failure. Describe the actions, as an engineer, that should be taken (should have been taken) to come to grips with the failure, utilizing one of the ethical frameworks you have learned about as a guide in influencing or determining your course of action. Describe the advantages and disadvantages of the actions you propose and provide justification using one of the ethical frameworks as a guideline in the analysis process.

Audience -

Identify an audience for your post-mortem write up – this can be either a government regulatory agency such as the NTSB or the FDA, the company's board of directors, etc. – and write your post-mortem analysis to that audience, including information and analysis that would be of most interest and of most use to them. The audience you are addressing must be clearly specified in your paper.

Researching and Analyzing the Case -

Choose one of the cases of engineering failure most related to your future career or professional interests. First, read about the case and understand the complex issues surrounding the case, including the parties in the case (corporate, government, etc.) and the various components including engineering, management, regulatory, socio-technical and ethical. Second, decide what the major issues surrounding the engineering failure are. Also, consider which of the ethical frameworks you have learned best explains the ethical lapses in this engineering failure case.

Your postmortem should follow this structure:

1) **Abstract:** A short summary of the engineering failure, its consequences, why it happened, and what should be done to prevent future problems. Your abstract should also clearly identify your **audience**. This can be either a government oversight committee, a company's board of directors, etc. Be sure that you write your postmortem to that specific audience, including information and analysis that would be of most interest and use to them. DO NOT

begin to work on the Abstract until you have finished the first submission of the paper (due Week 3).

2) **Background:** The body of your postmortem should begin with a narrative about *what* happened (the engineering failure) and what its consequences were.

3) **The Engineering Failure:** This section should explain what technical, engineering, management, regulatory, and/or other socio-technical factors led to the engineering failure.

4) **Ethical Analysis:** The section should analyze the ethical lapses (i.e. stakeholders' actions, decisions or interests, principles adopted or flouted, risks ignored and reasons for doing so, etc.) that contributed to the engineering failure. Try to brainstorm similar questions that apply to your own topic, and then answer them using at least one of the ethical frameworks you learned about in class to discuss the engineering failure. You might use this model to inspire your own ethical analysis (using duty ethics and/or utilitarianism and/or virtue ethics).

5) **Recommendations:** Drawing on at least one of the ethical frameworks, this section should first propose general ideas and then proceed to very specific recommendations about how to prevent similar failures from occurring in the future. What should have been done? What needs to be done in the future? Don't make simple arguments (i.e. there needs to be more or better regulations); instead, specify what regulations should be imposed (and by whom), what the parameters of such regulations should be, and how they might be enforced (and by whom). Describe the advantages and disadvantages of the actions you propose and provide justification, again using at least one of the ethical frameworks.

6) **Conclusion:** Your conclusion should address what we have learned (or should have learned) from the engineering failure you discuss. What progress, if any, has been made to prevent similar failures in the future? What remains to be done?

Common problems with the Ethical Case Study:

· **Application of an Ethical Framework:** You must apply a specific ethical framework to your chosen problem. However, before you apply it to your problem, you must give a general explanation of the framework. A good paper will answer the question: Why does this framework apply to the party at fault?

· **Ethical Lapses:** A listing of the ethical lapses involved in your case study must come after you state your ethical framework. Many students try to get ahead of themselves and start pointing out the ethical lapses early in the paper. You should identify how each ethical lapse violated your chosen ethical framework.

· **Solutions – What not to do:** Identifying solutions is one of the hardest parts of the essay. What you should **not** do is simply state what the party “should” or “should not” have done:

Example: The Therac-25 technicians shouldn't have ignored error messages.

Example: Intel should have recalled the defective processor.

Example: The Teton Dam engineers shouldn't have built the dam in the first place.

These “solutions” are painfully obvious, but more importantly, they are not helpful. They are simply opinions.

·**Solutions – What to do:** Propose a concrete, *specific* solution that will aid adherence to your ethical framework.

Example: Intel should force its employees to attend a seminar highlighting the importance of upholding virtues in the company (Virtue Ethics).

Example: The Hyatt-Regency Kansas City Hotel engineers [or the Teton Dam engineers] should require independent engineers to perform safety inspections at specific stages of design and construction (Duty/Rights Ethics).

Example: The Therac-25 technicians should immediately report error messages and machine malfunctions to AECL authorities, discontinuing treatment until receiving confirmation that the problem has been analyzed and corrected (Duty Ethics).

These examples represent concrete propositions.

Remember, since you proved that violating [ethical framework] ultimately led to failure, then your solution should be aimed at facilitating adherence to [ethical framework].

Logic:

Problem P will occur when X is violated

Stop violating X → Problem P will not occur.

Due Dates for Essay 2

The draft of Essay 2 is due during Week 6, and the final copy during the first discussion period of Week 8.

Engineering Ethics Case Study Topics

The following is the list of topics for the Ethical Case Studies essays during Fall, 2022. Many cases involve more than one discipline. We will post some suggested readings for the cases during the third week of the class so that you will have an easy time beginning your research on the topic that you choose.

Aberdeen Three – Three Army engineers at the U.S. Army's Aberdeen Proving Ground are prosecuted for allowing hazardous chemical wastes to be illegally stored and released to the environment, in violation of several Federal laws prohibiting such action. [The best place to start for this paper is Parts I and II of Jane F. Barrett and Veronica Clarke, "Perspectives on the Knowledge Requirement of Section 6928(d) of RCRA After United States v. Dee," George Washington University Law Review, v. 59, p. 862-888. This paper is available through the Lexis-Nexis database at the UCLA Library's website. If you are having trouble finding it, contact Browne.]

I-35 Bridge (Minneapolis, Minnesota) – On August 1, 2007 the I-35 Bridge across the Mississippi River in Minneapolis collapsed catastrophically, killing 13 and injuring 145. The caused was an

undersized gusset plate, which was not noticed during the design phase or during repeated inspections. Start with the National Transportation Safety Board's report.

Synthes' Norian XR Bone Cement – During the early 2000s Synthes, Inc. introduced a new bone cement (Norian XR) for human use without required clinical trials, in spite of clear evidence of harmful – often fatal – results when used for spinal surgery.

St. Francis Dam – A concrete dam near Los Angeles fails catastrophically on first filling in 1928 due to bad design and construction. [See Browne for a very recent contribution to the literature on this failure].

Other ethical case studies are possible if you have a particular interest in some subject. Check with your TA or Browne before starting for instructions and approval.

Research Sources

You should use substantial sources such as (but not limited to):

The Economist

The Los Angeles Times

Nature

The New York Times

Scientific American

Smithsonian Magazine

Time Magazine

The Wall Street Journal

Any scientific or technical journal (such as the ASCE Proceedings, IEEE publications, etc).

You should not use Google or Wikipedia as anything other than a place to find more substantial resources. You will probably find the most important relevant sites in the first twenty or thirty hits on Google, and the list of references in Wikipedia may be more important than the article itself. Nor should you use any small or local newspapers/periodicals unless they are very relevant (e.g. New Orleans' *Times-Picayune* newspaper would be useful if you were doing a topic related to Hurricane Katrina). And you should not use random websites or blogs—the authors you cite should write with some institutional or governmental authority.

In addition, papers that are obviously student papers from another university should be avoided – quite often the information or analysis is simply wrong. This admonition applies specifically to ethics “papers” from Texas A&M University and Brown University.

Reference Material

If you have problems writing, you might want to consider a writing handbook, such as one of the following:

- An Engineer's Guide to Technical Communication* – Sherly A. Sorby and William M. Bulleit. Prentice Hall, 2005.

- Engineers' Guide to Technical Writing* – Kenneth G. Budinski, ASM International 2001. *The Essence of Technical Communication for Engineers: Writing, Presentation, and Meeting Skills* – Herbert L. Hirsch. IEEE, 2000.

- A Guide to Writing as an Engineer* – David F. Beer & David. McMurrey, Wiley 2009 (3rd Ed.)

- Making Sense in Engineering and the Technical Science: A Student's Guide to Research and Writing* – Margot Northey & Judi Jewinski. Oxford University Press, 2009 (3rd Ed.).

- Pocket Book of Technical Writing for Engineers and Scientists* – Finkelstein, McGraw-Hill, 2007 (3rd Ed).

Also, more general writing texts and reference works might be useful, including:

- Your English 3 Textbook

- The Elements of Style* William Strunk, Jr., and E. B. White. Longman, 1999 (4th Ed).
[Everyone should own Strunk and White.....]

If you need a dictionary, a good online dictionary is available at <http://dictionary.cambridge.org>

Finally, if you have quick questions on style, grammar, or punctuation you might find the University of Minnesota Center for Writing's Quicktips web page helpful:

<http://writing.umn.edu/sws/quicktips/quicktips.htm>

(Ignore the "Documentation" section since we use different forms of citation and bibliographic form than they do, but the rest of their pages are can be very helpful).

