

Engineering 101: Engineering Ethics Instructor: Dr. Ken Hough
Midterm Exam, Fall 2018

The exam is composed of 2 parts: **1 shorter essay question** and **1 longer essay question**. You have a choice on the short essay portion, but you must answer both parts of the longer essay. Your answers should be typed (as an MS Word document in .doc or .docx), written in paragraph form, and cite the relevant materials. At minimum citations should consist of an author's last name or title of the text and page numbers in a parenthetical citation.

Example: Jarod Lanier dislikes Google's and Apple's business model (Lanier, p.4).

Your writing should be logical, fully proofread, and uploaded to Gauchospace by SUNDAY, NOVEMBER 4, by 11:59 pm.

NOTE: Submissions that are illegible (including corrupted files) will be considered missing and/or late. It is up to each student to make sure their files are readable.

Remember: You should draw on information from the readings, videos, and lectures to answer the following questions. In answering the questions, be sure to:

- Use specific examples whenever possible
- Describe the example you are using (explain how it supports your argument)
- Have an introduction with thesis statement, supporting paragraphs, and conclusion (for long essay only)
- Answer all parts of the question

PART I - SHORT ESSAY (40%) (approx. 1-2 single-spaced pages, or about 500-1000 words) – choose **only one** of the two following questions:

Note: In answering **one** of the following prompts you should **reference and cite** at least **2 specific sources** (articles, video clips, etc.) provided on Gauchospace. In each prompt, there may be multiple questions, all of which need to be answered.

1. Summer Smith, a former classmate of yours graduated a year before you and took a job as the junior department manager at a nuclear power plant. She also sits on the plant's safety committee, but is the most junior of all the members. She has privately expressed her concerns to you that the plant's maintenance is not always up to par. For instance, she recently discovered that the plant's heat exchangers are running slightly below minimum requirement, despite having been recently repaired at great cost. While in the weekly safety committee meeting, she finds that the other committee members are willing to justify continued plant operation, despite the issues. Summer is not comfortable, believing that in an emergency the heat exchangers might become overtaxed, and could result in power brownouts or, in a worst-case scenario, cooling water flow might be severely reduced and a catastrophic meltdown of the plant might occur, endangering the local population. Rick Sanchez, the chair of the committee explains at the onset of the meeting that they need to act fast: any more slowdowns will cost the company millions of dollars and anger the public. Morty and Jerry, two of the other members immediately agree that the plant should stay in operation. The others also seem in agreement, though haven't said anything concrete. Rick says "Well, if no one objects, let's recommend we stay open." Only Summer objects, raising her safety concerns. Rick believes she is being overly concerned, especially because she is new to this job. He jokes, "I've been here 20 years, you kids are always coming up with crazy doomsday scenarios." Beth, another member, says that neither this power plant nor any other of its type has ever had a problem like the one Summer's describing. She reminds Summer that the plant's system is one of accident migration, designed to handle unusual occurrences. Jerry notes that the company is number one in safety and has won awards for its safety measures. Morty points out that the committee has always unanimously approved or rejected any proposition, not by requirement but by tradition. Rick asks if any other members have similar objections. There are cautious looks, but no one speaks up. Rick again calls for a vote, but Summer, who still has reservations, excuses herself for a minute to use the restroom. Instead, she ducks out and calls you for your advice. Ironically, you are currently taking an engineering ethics class (what luck!) and have lots of examples and ideas to share with her. But remember, she has only a few minutes so you will need to be succinct and to the point, while also building your case upon concrete examples.

How would you explain to Summer the groupthink pressures she is facing? What advice would you give to help her reach an optimal position? In helping to guide Summer through this dilemma, you will need to back up your position **using and citing specific examples** from class materials regarding **at least two (2)** of the following subjects: **E-Waste, GMOs, self-driving cars, NASA and groupthink, the WTC disaster, the Deepwater Horizon oil spill, and/or nuclear power and the Three Mile Island meltdown.**

2. Many of the topic we have thus far covered in class (in lectures, readings and videos) demonstrate clearly how social, economic, and political pressures existing outside of the actual engineering of a project can significantly impact the engineering/ computer science profession, often for the worse. This is all the more troubling since outside pressures may be coming from those who, unlike professionally trained engineers, do not fully understand the specific engineering or technological issues at stake. However, some argue that despite engineers' expertise, it is not their place to pursue social and/or political agendas or seek to change public policy through their work. Instead, engineers should remain neutral and above external social and political issues. In weighing in on this debate, **choose one (1) of the following statements** (a or b) and, in backing up your position, **use and cite specific examples** from class materials regarding **at least two (2) of the following subjects: E-Waste, GMOs, self-driving cars, NASA and groupthink, the WTC disaster, the Deepwater Horizon oil spill, and/or nuclear power and the Three Mile Island meltdown.**
- Although engineers should be required to hold paramount human health, welfare and safety in the performance of their engineering work, they should not be required as professionals (that is, required by the codes of their professional society) to inject political and social concerns into their work not essentially related to their immediate goals. An engineer is not an expert in public policy. As a professional group, engineers have neither the ability nor the training to plan social change. It is better for an engineer to be loyal to her or his employer and to leave large scale ethical considerations to public policy experts.
 - Engineers have the right, in fact the *responsibility*, to contribute to debates on public policy as both private citizens and as professionals through their work. This includes *organizational disobedience* (such as refusing to carry out assignments they feel are wrong or to openly protest an employer's actions) with regard to ethical issues, as this is obligated by both their personal and professional sense of ethics. Engineers are just as important a voice in public policy questions (perhaps the most important when speaking to engineering subjects) as politicians, public policy experts, and individual citizens. Loyalty to an employer, while important, can also be an abdication of professional responsibility if carried out in excess.

You do not have to agree with all aspects of whichever statement you choose (beware false dichotomies!), but if you have a diverging opinion you should explain exactly what it is you disagree with in the statement and why. Also, be sure to explain clearly which statement you are choosing to adopt and write about – **don't make us guess!**

PART II – LONG ESSAY (60%): (approx. 2-4 single-spaced pages or about 1000-2000 words):

By this point in the class we have not only familiarized ourselves with some of the basic ethical frameworks that exist, but also have seen some the kinds of ethical dilemmas facing engineers and society in general. Hopefully you have begun to formulate your own sense of right and wrong and how you might steer through an ethical dilemma, should one ever arise in your professional or personal life. This prompt will draw from your beliefs, opinions and understanding of ethics so far. It is divided into two parts, each part must be answered:

PART #1: Create your own personal code of ethics.

Imagine you have a laminated card in your wallet that describes your basic code of ethics. It starts first with a **simple credo** -- an "I believe/ I promise/ I will demonstrate/ I will uphold," etc. statement with specific commitments. For example:

"Ken's Handy-Dandy Code of Ethics: In acting ethically, I believe I should strive for the protection of animals, seek continuous learning, have a commitment to help the disenfranchised and underrepresented in society, and take a pragmatic and duty ethics-based approach to dilemmas that might arise."

The credo is then followed by **a set of short but specific statements** that explain in more detail each commitment you have in your credo (**each commitment** should have **at least 1 statement**, and there should be between **4 and 10 statements total**):

My Basic Credo

1. Follow Up Statement #1
2. Follow Up Statement #2
3. Follow Up Statement #3
4. Follow Up Statement #4

For each commitment that you mention in your credo, you should indicate some specific sources or influences for your beliefs, such as people in your life, personal experiences, inspirational events or personalities, or examples drawn from class materials. For example:

1. *To protect animals, I will never engage in animal testing and will obstruct all attempts at testing on animals whenever possible. This aspect of my code is based on the many years of volunteering I have done at animal shelters...*
2. *The video we watched in class WHY THE TOWERS FELL has inspired my fourth commitment of embracing pragmatism and duty ethics, because...*

Your code may be intended to serve as a guide for your professional life, but it must include any other commitments that would make your code meaningless if they were not followed consistently. For instance, if you are strongly committed to preserving the environment, protecting intellectual property, upholding privacy rights, etc., you probably need to include those elements in your code.

You can write this section in paragraph form or in bullet form, whichever you prefer. Either way, your statements should be complete ideas and sentences, and should specifically cite class materials (lectures, readings, videos) where appropriate.

PART #2: Choose one (1) of the ethical dilemmas listed below and in a short paragraph illustrate how the personal code of ethics you just outlined above would help you assess and act to mitigate a real-world problem.

- a) You have observed a supervisor repeatedly sexually harass a colleague, but your co-worker has not yet taken any action, despite appearing distressed and unable to function properly at work. You've heard rumors that the supervisor has done this sort of thing in the past, but you also know that this executive is a major reason why the business is doing so well.
- b) Documents are given to you proving that top executives in your company are engaged in fraud, which has resulted in short-term profits but is both illegal and unsustainable, meaning it could lead to the collapse of the company and the loss of many jobs. The public and investors are not aware of this; disclosure could also destroy the company and cost many jobs.
- c) Due to recent cutbacks at your company, your supervisor now requires you to take on the workload equivalent to that of 3 people and insists that you keep in constant email, cell phone, and Skype/ Facetime contact with her, mostly outside of normal business hours, which is interfering with your private life.
- d) You have discovered a flaw in a product you helped designed that may endanger public safety and/or privacy, but could also cause you embarrassment, result in a loss of employment, or possibly even criminal charges if it is discovered.
- e) A wildly popular video game (with adult themes, such as extreme violence) made by your company has been criticized for negatively affecting younger players, though it is not necessarily marketed at them. You have unexpectedly been chosen as a spokesperson to defend the company at an impromptu press conference.
- f) An inferior product is chosen for production over the superior one you helped to design, mainly due to what you see as flawed beliefs inside your company (including short term fiscal reasons) or external political pressures.
- g) A device you originally designed to monitor traffic accidents is now being developed by your company for secret government surveillance operations, both inside your country by local police departments, and outside by authoritarian, despotic regimes.
- h) You notice that a few top executives in your company are engaging in overbearing political speech in the workplace (more than just displaying posters and buttons) that you feel goes beyond freedom of speech and borders on indoctrination. Employees with conflicting opinions are afraid to raise any objections. Moreover, contracts are only being awarded to contractors who share their political beliefs, ignoring contractors whose work or pricing may be better for the company.