

Ethics I for Professional Engineers

**PDH Now, LLC.
857 East Park Avenue
Tallahassee, FL 32301**



Ethics I for Professional Engineers

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Course Outline

1. Approaching Ethics
2. Ethical Theories
3. Serving the Public and Professional Ethics
4. Examination

Provider Note:

Florida requires that courses on ethics be approved by the Board and Ethics I for Professional Engineers has been approved and given Course #0009949. Several other states also require that licensees take a course in ethics; however they do not approve courses. This course will satisfy the requirement for an ethics course as well.

Chapter 1

Approaching Ethics

A. Purpose

Ethics is defined as the study of standards of conduct and moral judgment; moral philosophy. The purpose of this course is to provide guidelines for ethical conduct for practitioners engaged in engineering activities.

B. Ethics and Morality

Ethics and morality can be condensed into one simple concept that can be expressed using the words “should” and “ought”. Good and right actions are actions that you “ought” to do. Bad character behavior is something that you “should” try not to develop. Ethics is about something a little bit more ambitious than science. It is about the way the world “ought” to be or “should” be. How you, as a practitioner, find out what you ought to do is the subject of this course.

While the terms “ethics” and “morality” have two different definitions in the dictionary, they are most often used interchangeably, without any effort to distinguish between the ideas. You can argue whether something is immoral or just unethical, whether someone has ethics but no morals, or whether ethics is about society but morality is about the individual. In the end these arguments are moot because both ethics and morality are actually about the same. If it’s true an act is immoral then you ought not to do it. The situation doesn’t change if the act is unethical. It is still something you ought not do. With regard to ethics and morality, you need to find out what the relationship between you and your client or associates should be and how you should act, feel and think toward them based on that relationship.

While it is not necessary to differentiate ethics and morality, it is necessary to distinguish between concepts of ethics (or morality) and legality. There is some overlap between ethics and the law but they are not always congruent. In certain instances an act may be illegal but ethically acceptable. Exceeding the speed limit to rush someone to a hospital in an emergency is a good example. If ethics and legality were the same thing, all laws would be ethical, and all ethical acts would be permitted under the law.

C. Arguments for Being Ethical

The most basic question posed as a result of a study of ethics is: "Why be ethical?" There are two basic responses:

1. Ethics pays off. It is in a person's self interest to be ethical. An ethical person can develop a much richer relationship with colleagues and clients because people trust the ethical person to do what is right.
2. Ethics is required in order to live a life of integrity...to do what is right. Two features of integrity stand out:
 - a. Internal integrity which involves a state of wholeness or completeness. A person has a strong sense of who he or she ought to be.
 - b. External integrity which points to the need of making sure that the principles, character traits, or behaviors that compose a person's ideal way of living are the right ones.

D. Living the Ethical Life

Creating an ethical life plan is important because making a commitment to being ethical is important. The following steps or actions constitute a start down the ethical path.

1. Take stock. Identify your current customary practices and ethical intuitions by doing the following:
 - a. Determine your mindfulness by being aware and knowing what you do, what you think, and how you ethically feel about things.
 - b. Identify what your moral intuitions and beliefs are because they form your moral core.

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2. Build your moral framework. Be mindful of your intuitions and use them to identify the ethical theory that most closely approximates your way of thinking.
3. Identify where you need to go. Once you have solidified your intuitions and developed a solid moral core, you may have to do things you do not currently do in order to establish an ethical life plan. Similarly, you may need to reject some of your current habits.

In summary, figure out who you need to be and make sure you follow through, assuring that your life plan and actions reflect your core intuitions and values.

E. A matter of opinion.

Many discussions pertaining to ethics end by concluding that “It’s just all a matter of opinion”. Three theories that support this thought include: (1) subjectivism, (2) cultural relativism, and (3) emotivism. Many philosophers have found those theories to be seriously flawed because they do not stand up to scrutiny when closely examined.

Subjectivism says that ethical statements really are just statements of personal opinion and nothing more. This seems to entail that a person is completely infallible about ethics and, as most of us know, this is not always true.

Cultural relativism is the ethical theory that says right and wrong are relative to one’s culture and that no one universal ethical standard transcends culture. This approach is usually intended to promote tolerance of other cultures. Problems associated with this theory include the definition of culture, the lack of toleration of other cultures, and the fact that the term itself is contradictory.

Emotivism is the view that ethical standards are really just expressions of emotions and not statements of fact. To describe all the ethics as expressions of emotions involves saying one of two things:

1. Rational arguments about ethics do not make sense.
2. Somehow, expressions of emotions can be part of the argument.

The flaw in emotivism is that: (1) people make rational ethical arguments all the time and, (2) it is not clear how expressions of emotions can be part of arguments.

Chapter 2

Ethical Theories

Ethical theories are ways of understanding what human beings ought to do or be. A total of five major ethical theories have been identified and will be briefly discussed in this section.

A. Virtue

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According to virtue ethics, what is most important to ethical life is the commitment to being a good and virtuous person. Virtue ethics is concerned more with character and less with actions or rules. To become a virtuous person you have to dedicate yourself to being an excellent human being. When you ethically focus on character, you hope that you and the people around you have admirable character traits such as honesty, courage, or loyalty. Virtue ethics stresses the fact that character, whether good or bad, defines a person. Clearly, some character traits are good and others are bad. Good character traits are called virtues and bad traits are called vices. The more virtuous traits you have, the more admirable you are as a person. Caring about developing the right character is a non-stop challenge at all times...it is a way of life. The moral of the story in virtue ethics is that life has no ethical-free zones.

B. Utilitarian Ethics

Consequentialist theories stress the importance of focusing on the consequences of a person's actions. The most popular consequentialist theory is called utilitarianism which argues that, if you can increase the overall happiness of the world in some way, then you should. Consequentialist ethical theories separate right and wrong actions by focusing on the degree of good (or bad) consequences the actions produce. Utilitarianism is the form of consequentialism that evaluates consequences by how much happiness, or conversely, how much suffering they contain. Think of utilitarianism as the consequentialist theory in which good consequences are defined in terms of happiness and suffering.

C. Kantianism - The Ethics of Principle

The 19th century philosopher, Immanuel Kant, laid out the framework for an ethical theory arguing that all the answers to ethical questions can be found in principles determined by practical reason. He thought that one single, supreme underlying

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principle, which he called the categorical imperative, gave rise to all other ethically important principles. He thought this underlying principle was accessible to everyone by the use of something called practical reason, or rationality. This is the root of Kantian ethics, which Kant believed separates human beings from all other animal species. Since Kant's ethics are based on principles, it is important to differentiate principles from rules. Essentially, rules are a set of guidelines imposed by external authorities while principles are laws you apply to yourself or personally embrace. Kant believed that the principles you live by should be those forged by your own practical reason. So the defining struggle in an ethical life is the battle between two forces that motivate human actions.

1. Inclination. Acting from inclination is when you are motivated by what you naturally want to do. Inclinations are your natural habits.
2. Duty. Acting from duty is when you are motivated by the principle forged by practical reason. When your own rationality provides a source of motivation to act, you are doing something for the simple reason that it is the right thing to do. Kant calls this acting from the motive of duty.

D. Contract Theory

A type of ethical theory called contract theory attempts to base ethics on actual or hypothetical agreements between human beings. Essentially, the theory advocates that "the right thing to do" does not depend on consequences or principles or virtues but, instead, on agreements between people. In other words, ethics literally does not exist until people enter into certain agreements about what one person can do to another person. This way of thinking about ethics is known as the contract theory. The word "contract" can be confusing because what immediately enters people's minds is signing a piece of paper. However, in addition to written contracts, there are verbal agreements. These verbal agreements are made with a handshake and, simply, a tacit understanding. Contract theorists take implicit contracts more as models of written contracts. At their essence, contracts are just agreements between people who act in certain ways. Most contract theorists do not care to model ethics on contracts people make, because these contracts may be exploitative. Rather, they focus on the contracts people would make if they were thinking rationally. Ethics thus depends on the best contracts people could possibly make with one another.

E. The Golden Rule: Common Sense Ethics

This ethical theory is nothing more than the act of embracing the Golden Rule. In other words, treat others as you wish to be treated. The Golden Rule and its many variations have endured for many centuries. It has such endurance because of many redeeming qualities, including the following:

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1. It appeals to common sense
2. It is short, clear and simple
3. It builds on motivations and feelings people already have
4. It has an obvious and immediate practical importance.

The Golden Rule has endured for many thousands of years because of the following reasons, which are based on the rule's redeeming qualities.

1. It is easy to learn and understand. Ethics can involve complicated reasoning, but the Golden Rule makes it easy to explain why an action is right or wrong.
2. It makes sense. The Golden Rule has the advantage of being truly commonsensical to people regardless of their particular cultural, religious or historical background.
3. It motivates people. Successful ethical approaches tend to succeed in building onto motivational structures and desires that people already possess.
4. It helps maintain civilized society. If you want to live in an efficient and orderly society, widespread use of the Golden Rule is crucial. In fact, most actions leading to social unrest, chaos, or fear spring from a rejection of the Golden Rule's way of thinking.

Ethical theories can sometimes get really complicated. With the Golden Rule, all you need to do is view a situation from how someone else would see it before you act.

Chapter 3

Serving the Public and Professional Ethics

A. Exploring the Ethics of Work

By and large, ethical responsibilities at work are a lot like ethical responsibilities in the rest of life. After all, deception, coercion, and harm are just as wrong in the workplace as they are in your home or community. When people enter the workplace, they don't step into a magical portal where anything goes. In fact, in the professional workplace, some jobs require even more of you from an ethical standpoint. What these additional responsibilities are depends on your job or profession.

Some people even choose lives where they're called to use their professional skills on their days off. For example, doctors may receive patient care questions in the middle of the night, lawyers unexpectedly may have to go to court to oppose motions, journalists may have to drop everything to cover a story when it occurs, and so on. You never really "go home" from work in some professions.

In addition to living up to standards in your personal life, professional ethics may require you to go above and beyond the call of duty. So as a professional, your job may require you to follow more specific and difficult ethical standards. Don't make the mistake of thinking professionals can live outside of ethics. Professional work can actually be a lot more ethically demanding than the rest of life.

B. Knowing the difference between jobs and professions

Sometimes work is just work – it simply pays the bills. This is often the case when one's job doesn't have a lot of effect on other people's lives. But, of course, there is no job that has *no* effect on people's lives.

But in some jobs, society expects more care from the people who take them on, and this is where professional ethics take the stage. A doctor, for instance, must operate with more meticulous standards than a grocery store checkout clerk. This assessment

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isn't meant to patronize grocery store clerks, but it's clearly a slightly less demanding job than being, say, a brain surgeon.

The jobs that require higher standards of conduct generally are called *professions* as opposed to simply *jobs* or slightly more complicated *trades*. But defining a profession as simply "not a job or a trade" isn't enough. The definition needs to explain what it is about professions that make them so special.

Here are some principal characteristics that make professions unique from jobs and trades:

- Professions require significant amounts of training.
- The training generally requires some significant intellectual component.
- Professional work provides an important service to society.
- Professionals have a great deal of latitude to exercise their skills to protect the public.
- Often a profession fosters the networking of large groups of other professionals in the field, leading to the creation of professional societies (like the American Medical Association for doctors). These societies usually are in charge of fashioning the profession's ethics code and credentialing newcomers to the field.

Professions aren't inherently better, more difficult, or nobler than other jobs. But the necessary place professions occupy in society allows professionals to cause much more harm than the average job or profession. This risk means any reasonably complex society just wouldn't function very well without professionals acting ethically.

C. Exploring the relationship between professions and society.

Professionals tend to have higher ethical expectations than individuals who work in trades or some other kinds of jobs for a couple of important reasons, which we discuss in the following two sections.

Professionals tend to earn higher salaries and status levels.

Societies tend to pay professionals more because it's quite expensive to become a professional in the first place. (The many years of schooling and training aren't cheap.) They also receive a fair amount of status when becoming professionals – people in a society look up to and trust the people who hold these positions. However, in return for

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these benefits, society expects competence and ethical behavior on the part of professionals.

Professionals tend to have more power and need more scrutiny.

Because of the higher salaries, professionals are expected to exercise their roles responsibly.

In addition to responsibilities, professionals often gain rights and privileges to do what no one else in society can do. Try getting a permit to build a skyscraper in lower Manhattan. No matter how well you argue a case in your living room, you're not allowed to legally argue a case in a court of law without a license to practice law.

In other words, professionals experience a higher level of regulation in their work, because their potential impact on society is so great. But for all the societal hurdles professionals jump, they need society just as much as society needs them.

Most professional practices can be regulated by law, but the law can't be in every professional's office. As a result, the professions have a duty to police themselves and hold their members accountable for unethical behavior.

D. Walking the line: What professionals are required to do

Professional work can be a bit daunting because of the tremendous power and responsibility society gives to a professional. And with these extra responsibilities and rights come difficult ethical decisions.

Sometimes ethics requires professionals to do things that would be considered ethically wrong for nonprofessionals. In the U.S. justice system, for instance, a defendant is innocent until proven guilty and has the right to representation. This right holds even if the person is obviously guilty (even if hundreds of people saw the crime). Professional defense attorneys are ethically obligated to present the best possible case for their client – even if this defense is flying in the face of well-established facts. Furthermore, prosecutors in legal cases are required to share evidence with the defense even if it would strengthen the defense's overall case. Outside of those professions, such codes of appropriate behavior may seem a little odd.

Even when they aren't required to do things that breach traditional ethical standards, professionals often are required to go above and beyond what nonprofessionals would do. When building infrastructure, for example, this requirement is put in terms of a

“safety factor” that exceeds what the project needs in order to do the job. Engineers building bridges, for instance, can’t just build a bridge that will get a car from one side of the river to the other. They have to account for hundreds of thousands of cars over many years with all sorts of different weather conditions. If you can build a shed in your backyard that can withstand an earthquake, good job. But engineers regularly have to worry about the worst earthquake ever to hit an area and design something that can withstand twice that kind of force.

E. Examining two general problems in professional ethics

Although different professions have different professional responsibilities, all professions share a commitment to some general points of ethics. The following sections cover two of the more important ones.

1. Working for two masters: Conflicts of interest

Professionals often find themselves in situations where they can enjoy benefits not available to the regular public. When someone’s work stands to serve an interest in conflict with their obligation as a professional, that person is experiencing a *conflict of interest*.

Conflicts of interest are problematic for professionals because they threaten to undermine the impartial, trained judgments that make professions so beneficial to society. The most common type of conflict of interest is when a professional is offered gifts or monetary bribes to sway his or her expert judgment. Professionals are better off by avoiding conflicts of interest because they must maintain the integrity of their professional judgment.

Not all conflicts of interest are quite as evident as accepting money or gifts as a bribe. Some conflicts are more subtle. Say, for instance, that Lisa is a counselor who does individual therapy. One of her clients is James, who she has been seeing every week for the last few years. Over time, Lisa has to make sure that she doesn’t grow too friendly or romantic with James. If she does, her impartial judgment about what is best for him may come to conflict with her friendly or romantic feelings for him. Even if she believes she could manage to keep her professional judgment separate from her professional feelings, she has a duty to recuse herself and refer him to another counselor.

Of course, in certain cases a professional may experience a conflict of interest and still behave ethically. Sometimes engineers, for instance, work in such

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extremely specialized areas that they really may be the best people to design and police the safety of a project. This situation occurs a good deal in the defense industry where contractors and the government work closely on carefully guarded secrets, and the government just doesn't have enough knowledgeable people to go around.

Even when a conflict of interest won't necessarily lead to compromised professional judgment, professionals always should disclose the conflict to both interests. A conflict of interest itself may not always be the death of professional judgment, but hiding conflicts almost always signifies that something dubious is going on. At least, when conflicts are disclosed, the people to whom they're disclosed can monitor a professional's judgment for any sign of corruption. Simply informing the right parties in such a case that you may need to be watched a bit more carefully is the ethical thing for a professional to do.

2. Whistle Blowing: Tattling or Protecting?

Professionals rarely are lone wolves. Doctors work in groups or for hospitals. Lawyers can practice individually, but usually work alongside one another in firms. So when the organization a professional works for does something unethical that needs to come to light, plenty of people may feel an obligation to disclose the information to outside sources. When people bring these bad practices to light without the company's permission, it's called *whistle-blowing*.

Imagine that John is a lawyer working for a large car company. He comes across documents that show that a model sold by the company fails far more crash tests than is allowable under federal law. Furthermore, John takes the documents to his supervisor, who dismissively tells him not to worry about it and tucks the documents under his desk. After seeing this, John goes to his supervisor's boss, but she also declines to take any action. If you were John, what do you think your ethical responsibilities are: If the danger to the public is serious enough and the company really is acting illegally, John's duties as a professional may require him to disclose the information outside the company's chain of command. His duty to the public and his profession can outweigh his duty to his employer.

Disclosing information about unethical activity may sound fairly easy, but in real life, the decision to blow the whistle is anything but simple. Generally, a professional is obligated to blow the whistle when

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- a. The harm or ethical wrongdoing is serious in nature and will continue if not made public
- b. The professional has exhausted all reasonable procedures for solving the problem within the organization
- c. The professional has enough evidence to make a plausible case to the public

Whistle-blowing can be noble and ethically necessary, but that doesn't mean that whistle-blowers always are celebrated as heroes. Although the public may be thankful, whistle-blowers often are met with anger and silence from their colleagues and the industry. They're seen as violating a bond of loyalty and a duty of confidentiality to one's team. Even though the law protects whistle-blowers in most cases, they often find it difficult to work in the same organization or industry after blowing the whistle. Professional ethics suggests that a duty to public safety comes first, but it can be difficult for organizations to appreciate disloyalty, even when it happens for the public good.

F. Analyzing the Diversity of Professional Ethics

Professionals share in common many duties, but each also has its own specialized set of ethical concerns. Each profession has a different role to play, and with those different roles come different responsibilities. For example, doctors and engineers share a commitment to preventing harm, but they fulfill that commitment in different ways. The following section will briefly discuss some of the important ethical responsibilities in the engineering profession.

G. Engineering: Solving technological problems safely

No matter where you are, you're surrounded by the work of engineers. Engineers design everything from the car you drive to the roads you drive on to the machinery used to manufacture the radio in your dashboard. They even design the materials from which all these things are constructed. By and large, most of those things function and work properly.

Solving design problems with such amazing reliability and innovation takes a lot more than just technical expertise. It also takes ethics. Behind every good design is the virtue of competence and the value of safety. Something as tiny as a hairline fracture in a window can bring down a passenger plane and all its passengers. When engineers check and recheck their stress calculations on designs, they reinforce one of the most important ethical considerations that guides their design: Keeping people free from harm.

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Engineering ethics places one value above all else: safety and the protection of the public. But it's important to note that no design can be 100 percent safe in the sense of never causing harm. There's no such thing as a fool-proof design. Safety has to be defined in terms of *acceptable risk*. As long as a design's risk of causing harm is agreeable to rational people who use the product and are affected by it, the design can be considered safe.

For example, cars could be a lot harder to wreck if they were built out of solid steel. They also would be extremely heavy and expensive. But that doesn't mean today's cars aren't comparatively safe. Rather, people judge the current crop of automobiles as having acceptable risks regarding crashes and the injuries that come along with crashing. Society's tolerance for harm coming from poorly built bridges, on the other hand, is much lower. People won't accept bridges that collapse and kill people every so often, so engineers build bridges that can withstand twice or three times the amount of stress that a bridge is actually expected to endure.

Recently the notion of safety has been expanded in some engineering codes of ethics to include environmental protection as well. Designing plastic water bottles may not seem like it involves a safety angle, but if those water bottles don't biodegrade and end up getting stuck in landfills for all eternity, the space and health of future generations could be at risk. As a consequence, engineering ethics recommends that engineers make designs that minimize both future harms and present ones. After all, harm to future generations still counts as harm even though you aren't around to see it.

If all of this sounds a bit commonsensical, don't forget that most engineers aren't public servants but employees or contractors for private companies that expect to make money. Safety, especially long-term safety, is one of the first things on the chopping block when companies need to cut costs. This puts an enormous amount of pressure on a safety-and environmentally-conscious engineer who's trying to keep people from being harmed by bad designs. So it's necessary for engineers to refer to their professional responsibilities and ethical duties when working for private companies.

H. William LeMessurier: A real engineering hero

The Citicorp building in New York City was a towering achievement for architect and engineer William LeMessurier. At 59 stories tall, it was built on four stilts to accommodate a pre-existing church on the corner of the block. To stabilize the design, LeMessurier designed a system that would displace weight to a system of chevron braces throughout the building.

All looked good when the building was completed in 1977, but appearances were deceiving. After receiving a question about the construction of the building from a

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graduate student, LeMessurier found something frightening: Instead of welding the braces to the rest of the building as his design called for, the braces had been secured using bolts. A design that was supposed to be able to withstand gale-force winds could in fact only withstand 70 mph winds.

LeMessurier weighed his options and the risk to the people of New York City. Admitting to the flaw could be devastating to his career, but the disaster was too great for him to fathom. Fixing the design would be incredibly costly, and going public threatened to throw people into a panic. With all this in mind, LeMessurier immediately started to make plans to get the braces strengthened. He convinced Citicorp and the city of New York to allow the fixes to occur in secret, and hundreds of welders worked around the clock to install patches that would make the building safe. The building was fixed and New Yorkers went safely about their days.

In a lesson to professionals everywhere, LeMessurier didn't stubbornly refuse to see the flaws in his work or cross his fingers in hope that his worst fears wouldn't materialize. As a result, his humility, skill and courage are now celebrated in engineering textbooks and ethics textbooks alike. Professionals can't always avoid making mistakes, but the story of the Citicorp building shows that they can make ethical, honorable, and even heroic responses to those mistakes.

Chapter 4

Course Examination

After you have completed answering all of the questions, go back and check your work. Make certain that you have marked only one answer for each question. There is only one correct answer to each question. Make certain that you have answered each question. Any question that is left blank will be counted as incorrect.

A score of 70% is required to complete the course. Failing to achieve a 70% score all your answers will be erased. You will have three opportunities to achieve a passing grade. Failing to score a passing grade on the third attempt will block you from further attempts and your course fee returned to you.

Once you have successfully completed exam you will be able to print out your completion certificate. We suggest you file it electronically or print it out should you be audited by your licensure board for compliance with continuing education requirements. At that time you will also be able to compare your answers to the school answers on questions you may have missed.

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1. Creating an ethical life plan involves:
 - a. Taking stock of your current practices
 - b. Building your moral framework
 - c. Identifying where you need to go
 - d. All of the above

2. The thought that ethical statements are statements of personal opinion is known as:
 - a. Statements of morality
 - b. Subjectivism
 - c. Cultural relativism
 - d. Emotivism

3. Virtue ethics is primarily concerned with:
 - a. actions
 - b. rules
 - c. character
 - d. honesty

4. The ethical theory claiming that the answers to ethical questions can be found in principles determined by practical reason is known as:
 - a. Kantianism
 - b. Utilitarian Ethics
 - c. Contract Theory
 - d. The Golden Rule

5. One of the redeeming qualities of The Golden Rule is:
 - a. It is easy to learn and understand
 - b. It makes sense
 - c. It has obvious and immediate practical importance
 - d. It helps maintain civilized society

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6. A characteristic that differentiates professions from other jobs or trades is:
 - a. suitability or desirability
 - b. difficulty
 - c. eminence or renown
 - d. potential for causing harm to the public

7. A situation which leads to a compromise in professional judgment is known as:
 - a. disclosure
 - b. a conflict of interest
 - c. a bribe
 - d. whistle-blowing

8. The one value that engineering ethics emphasizes over all others is:
 - a. technical expertise
 - b. safety and protection of the public
 - c. adequate training
 - d. service to society

9. A profession's ethics code is usually fashioned by:
 - a. Laws regulating the profession
 - b. Pressures of society
 - c. Professional societies
 - d. Rules promulgated by the state licensing board

10. When a design's risk of causing harm is agreeable to rational people who use the product the it is known as:
 - a. a fool-proof design
 - b. a cost effective design
 - c. a design having a high safety factor
 - d. an acceptable risk

