Chapter 1:

Having read this chapter and answered the associated questions, readers should be able to

● describe recent changes that have taken place in the field of engineering,

and why this necessitates approaching engineering ethics from a different

perspective;

Engineering are becoming more international and global.

Because tradition engineering carries within it some uniquely US or Western features, and some of them are not adaptable to other parts of the world. Approaching from global perspective enables engineers to study engineering ethics without any cultural presuppositions.

● articulate not only the nature of ethics in general but also why it should be of

particular concern to engineers;

Ethics is about actions that have the potential to seriously impact the lives of others.

Engineers are singularly important to the world.

Engineers are different from the general public. They have specialized knowledge and skills that are only acquired and acquirable through long periods of intensive study and training.

Several specific ethical obligations for engineers are derived from the nature of engineering itself.

Positions of engineers entail not only responsibilities but also rights.

● explain the problem of theory and interconnected roles that reason,

engineers' role responsibilities, and case studies play in approaching engineering ethics from a global perspective.

Problems of Theory: Theoretical and Cross-Cultural Disagreements

The Role of Reason: Its Universality and in Engineering. Without the ability to reason, engineering could not exist.

Role Responsibilities: Special Duties

Case:

1. emphasizes the process of active learning, which has been shown to facilitate student understanding;18

2. helps students to build up an experience base regarding ethical issues before they actually have to deal with these issues in their professional lives;

3. helps students to develop their ability to analyze and solve problems, in terms of not only ethics but also engineering, enabling them see the connections between ethics and engineering more clearly;

4. aids in the ability to generalize by looking at a variety of specific instances

and, thereby, helps students to form a more general ethical perspective.

Chapter2

Having read this chapter, answered the associated questions, and completed the included exercise, readers should be able to

● understand why studying cases is important to engineering ethics education,

in general, and engineering ethics in global contexts, specifically;

1.Studying cases helps both students and practitioners to

learn actively, which has been demonstrated to increase understanding.

2.Determine the proper subject matter of ethical analyses;

3.Build an experience base regarding ethical issues before facing similar situations in the world;

4.Develop the ability to analyze and solve not only ethical but also engineering problems;

5.Recognize and understand the connection between the technical and ethical dimensions of engineering work;

6.Generalize by examining a variety of specific instances, thereby forming an integrated ethical perspective for oneself.

● describe the process of and justifications for the steps involved in the case-

study procedure;

Identifying Ethical Issues

Narrowing the Focus

Determining Relevant Facts

Making Reasonable Assumptions

Undertaking Definitional Clarification

Conducting Ethical Analysis

Reviewing the Process

Resolving the Issue

Identifying Practical Constraints

Avoiding Ethical Problems

● evidence the abilities involved in undertaking the initial steps involved in

completing a case-study analysis.

the use of reason and role responsibilities of engineers are needed in completing the case-study analysis.

Chapter 3

▪ Describe the relationship of professions to society and individual

professionals, and the "contract-model**" account of professions**

Give reasons engineering should and should not be considered a profession,

in relation to the history of engineering and current state of its professional organizations

In relation to the history:

In terms of its historical tradition, engineering was primarily craft-based, emphasizing the "apprenticeship" rather than professional model. Schools of engineering did not develop until the mid-19th century, and even then these were organized on a shop floor model. In other words, their main emphasis was on doing engineering rather than theoretical knowledge. Thus, both educationally and occupationally, the professional model developed.

Current state of its professional organizations:

Engineering has no central organization, probably in large part because engineering lacks universal licensing requirements. Instead, different organizations administer the various functions of the profession. Due to the wide variety of organizations to which engineers belong, the enforcement powers of engineering as a profession have been somewhat limited.

• Explain the nature of and reasons for codes of ethics for engineers, with

reference to both the history of codes of ethics and ASME as a sample code

Nature

Engineering codes of ethics are visible symbols of the profession's commitment to the public good.

In ancient Greece, Hippocrates developed one of the most famous codes for medicine. Its well-known introduction begins, “first, do no harm.” Even before that, however, a code existed with implications for engineers: in 1758 BC, the Babylonian king established laws for civil engineers in the Code of Hammurabi, based on an “eye-for-an-eye” philosophy: “if a builder has built a house for a man and has not made his work sound and the house which he has built has fallen down and so caused the death of the householder, that builder shall be put to death.”

Reasons:

For the sake of professionalization, protection of group interests, teaching etiquette, inspiration and education, enforcement, and public relations The ASME code consists of three main parts: (1) the Fundamental Principles, (2) the Fundamental Canons, and the (3) Criteria for Interpretation of the Canons

(1) The Fundamental Principles section describes ideals toward which engineers should aspire.

(2) The Fundamental Canons addresses the following: the fundamental responsibility of engineers to maintain public safety, the environment, requirements of competence, honesty, loyalty, and fairness, as well as duty to support the profession and professionalism.

(3) Criteria for interpretation of the Canons give more detailed interpretations of the canons, to provide engineers with guidance in how to interpret the canons and to provide the profession with specific, enforceable entries.

Chapter 4

• Give examples of why the need exists for broad but commonly agreed upon

principles of global engineering ethics, with reference to the case of Ford and Firestone/Bridgestone

(1) This crisis revealed cultural conflicts. Ford and Firestone took different approach in public relations campaign. Bridgestone did not seem to feel the need to deal with the press and public in the same way as Ford.

(2) Another source of conflict was differences in approaches taken by the two companies' leadership in response to the crisis. Firestone's approach has “weak global management”, and a lack of understanding of the need for public relations.

(3) The difference in approaches taken by the leadership of the two companies was also evident in the ways they assembled teams to deal with the crisis. “Japanese companies often respond too late to a crisis”.

• Explain problems associated with pre-given engineering ethical codes, how the

approach here is different, and why/how the safety of human life plays a central role in engineering ethics

(1) different persons and peoples subscribe to and are influenced by different cultural and social values, which present difficulties in formulating commonly agreed upon ethical principles for engineering in global contexts.

(2) the approach taken here consists in deriving principles for engineering ethics in global contexts through the use of reason, where the reader can follow along, better understanding, justifying, and ultimately employing these principles, thereby having a rational basis for following these principles.

(3) The greatest cost an individual can bear is the loss of life or significant injury. Given that engineers have knowledge and expertise concerning technology unavailable to the general public, one of the responsibilities that follows from their roles as engineers would be the protection of more ignorant individuals from potential dangers.

• List the first six basic ethical principles for global engineering and justify their

derivation based on the primacy of safety, as well as identifying instances in they are relevant in the case of Ford and Firestone/Bridgestone

(1) Public Safety: Engineers Should Endeavor, Based on Their Expertise, to Keep Members of the Public Safe From Serious Negative Consequences Resulting From Their Development and Implementation of Technology

Derivation: The greatest cost an individual can bear is the loss of life or significant injury. Given that engineers have knowledge and expertise concerning technology unavailable to the general public, one of the responsibilities that follows from their roles as engineers would be the protection of more ignorant individuals from potential dangers.

Instance: Firestone tires are involved in many crashes, injuries and deaths.

(2) Human Rights: As a Result of Their Work With Technology, Engineers Should Endeavor to

Ensure That Fundamental Human Rights are Not Negatively Impacted

Derivation: Respect for human rights has been firmly established on the global level. Specifically, engineers should not cause the violation of rights through their actions—a duty to respect human rights in carrying out engineering activities and the ability to refuse to participate in engineering activities that threaten such rights. **Instance:** Firestone tires are involved in many crashes, injuries and deaths.

(3) Environmental Protection: Engineers Should Endeavor to Avoid Damage to the Environment and Living Beings That Would Result in Serious Negative Consequences, Including Long-Term Ones, to Human Life.

Derivation: In terms of a global concern, preserving the environment has been a relatively recent phenomenon. If the environment is not adequately sustained, then human life will clearly be endangered.

(4) Competent Performance: Engineers Should Endeavor to Engage Only in Engineering

Activities They are Competent to Carry Out

Derivation: If engineering activities are carried out in an incompetent fashion, then these activities could have negative consequences that, again, endanger human life. **Instance:** Ford had different tire pressure recommendation with Firestone. Ford's motive for the initial recommendation was based on the need to increase the stability of the Explorer, and it had significantly reduced the margin of tire safety.

(5) Engineering Decisions: Engineers Should Endeavor to Base Their Engineering Decisions on Scientific Principles and Mathematical Analyses, and Seek to Avoid the Influence of Extraneous Factors.

Derivation: In one sense, the employment of science and mathematics is simply a characteristic of competent engineers. In another sense, using other types of principles and decision-making processes would be inappropriate, since engineers are engaged in illegitimate conflicts of interests when they allow nonengineering considerations to influence their judgments.

Instance: According to Ford, in each instance, it had asked Firestone to conduct tests on their tires and those sold in the Southwest United States and was told by Firestone that "there was no defect"

(6) Truthful Disclosure: Engineers Should Endeavor to Keep the Public Informed of Their

Decisions, Which Have the Potential to Seriously Affect the Public, and to be Truthful and Complete in Their Disclosures

Derivation: engineering is a rather esoteric activity, in the sense that much of what engineers do is opaque to the public. However, engineers cannot take sole responsibility for all the consequences that result from their actions. To begin to fit this responsibility into a larger context, communication with others is necessary. This communication must be of a nature that others can make competent decisions.

Instance: In 1999, Ford began a tire replacement program in Saudi Arabia—which they termed a "customer notification enhancement action"—without notifying either the public or the NHTSA

Chapter5

Having read this chapter, completed the included exercises, and answered the associated questions, readers should be able to

● with reference to the case of Hurricane Katrina, explain the value of and

difficulty in studying disasters, identify and apply the basic ethical principles for global engineering, and identify competing claims made on engineering and engineers from the perspective of safety;

Value of and difficulty in studying disasters:

1. Such circumstances highlight the paramount importance of public safety to engineering ethics and standards to address the nature of safety.

2. It is complex, and without understanding why events occur, it is difficult to learn from them.

● describe the ways engineering can be understood as a kind of "social experimentation" and the responsibilities of engineers that follow from this analogy;

The outcomes of experiments are uncertain : the introduction of new technologies into society can have unknown consequences

Responsibilities:

(1) A primary obligation to protect the safety of human subjects and respect their right of consent.

(2) A constant awareness of the experimental nature of any project, imaginative forecasting of its possible side effects, and a reasonable effort to monitor them. (3) Autonomous, personal involvement in all steps of a project.

(4) Accepting accountability for the results of a project"

● explain the natures of and criteria for assessments of objective and subjective safety and how these present challenges to engineers, especially in cross- cultural contexts;

Subjective safety consists in the feeling of not being in danger. Objective safety consists in the fact of not being in danger.

1.no product can ever be made perfectly safe

2.not all possible consequences can be foreseen.

3.for members of the public, the feeling of safety is influenced by knowledge

levels of risk acceptance vary culturally—in ways over which engineers do not have control—to a reasonable extent, they should be aware of cultural conditions in fulfilling their safety obligations. Obviously, however, there are limits beyond which engineers—especially on an individual basis—cannot know all the objective risks associated with courses of actions or the acceptability of these risks.

● with reference to the case of the Uber Rape Scandal, explain some responsibilities that engineering and technology firms could be claimed to have to the safety of their users.

Uber is the platform that lead the woman to meet with the man, so Uber should have the responsibility to ensure that the driver is not a criminal to protect the passenger.

C6

1. case
2. Describe the role of and justification for the importance of ethics in business contexts and how these would be different from engineering ethics in general:

   Ethical in business are needed to make sure that institutions can function normally.

   Business actions have ethical import because they have serious consequences in all other aspect of life and Physically harming a competitor to eliminate competition is just as wrong in business as physically harming a rival for interest.

   This difference is based on the fact that expertise is typically not required to engage in business
3. With regard to business environments, list and explain the justifications for the six principles of ethics for organizations and the six principles of ethics for employees:

   list: see Appendix-I

   Justification:

1. human safety, company should prevent unnecessary harms in business context.
2. Justice is an important principle in business
3. In any particular society, laws and regulations establish a framework for business conduct.
4. This principle is grounded on the more general ethical claim to respect persons, which includes being treated fairly and with respect.
5. Managers fail to fulfill their financial responsibilities to investors if they allow personal feelings to interfere with their decisions concerning employees.
6. If promises are not kept, then people cannot reach lasting agreements
7. Should follow proper directives as described in working contract.
8. in entering employment contracts, employees make promises to employers to perform certain jobs.
9. Knowledge can be a form of property in business context.
10. In working for corporations, employees should benefit those organizations or there would be no reason for corporations to employ them.
11. Workable human relationships require honesty.
12. Those in positions of corporate authority have the additional duty to ensure that the ethical responsibilities of corporations are promulgated and enforced within corporate environments.

4. Explain how engineering functions within the context of business environments, noting points of convergence and divergence in business and engineering ethics, as well as potential conflicts between the two:

   As corporate employees, engineers hold different positions within organizational structures. Engineers should be prepared to have their decisions challenged and should learn how to anticipate and appropriately evaluate costs and benefits

   Convergence and Divergence:

   First, since neither set of principles are applied independently of specific sets of circumstances and particular contexts—including those of culture and society—neither set of principles should be considered independently from the contexts in which they are applied.

   Next, although business and engineering ethics share common concerns— such as honesty and legality—to a significant extent, they deal with different domains and associated issues.

   Finally, different forms of applied ethics relate to each other. Engineering shares this fundamental feature with business.

   Conflict:

   In considering potential conflicts, the most important point to keep in mind is that the bases for making decisions in these two domains are different: decisions in business are based primarily on profits, whereas decisions in engineering are based primarily on the implementation of technologies.

5. Describe the importance of ethical engineering to business:

   Ethical in business are needed to make sure that institutions can function normally

C7

1. case
2. Describe why it is important for engineers to be aware of cultural values when working in international and cross-cultural environments:

A difference exists between establishing a theoretical framework for engineering ethics and the real-life practice of engineering. With regard to the latter, it is important to recognize that local cultures can have significant impacts on engineering practices—especially in the context of business—and engineers should respect local customs and traditions.

3. Explain “normative ethical relativism” and why is it an unsatisfactory position for an approach to engineering ethics in global contexts.

   Explain: It begins with the factual thesis that different individuals and groups subscribe to different ethical positions—a relatively uncontroversial claim—but makes the further assertion that individuals and groups are justified in subscribing to the beliefs they do.

   Why unsatisfactory: within this tradition, the only justification needed for adopting a particular ethical position is the fact that individuals or groups adopt it. However, Individuals or groups might adopt particular ethical positions for good, bad, or no reasons at all. So it's nonarbitrary here.

4. show an understanding of the nature and importance of the distinction between moral and nonmoral cultural values, as well as why this distinction should be important to engineers:

   Judgments based on nonmoral values are not generally considered either right or wrong. In moral judgments, by contrast, claims are made regarding the rightness and wrongness of decisions and actions.

   This is important because without it then all value judgments—both moral and nonmoral—are understood as having equal claims on the individual.

C8

1. case
2. Describe the notion of autonomy in general and its relation to conceptions of being human and politics specifically:

   “Autonomy” is closely related to individuality and refers to self-determination and independence from coercion, both internal and external, making decisions for oneself.

   Autonomy as central to either being human or political activities.

3. In contradistinction to these other understandings of autonomy, explain the role that professional autonomy plays in engineering ethics:

   Autonomy for engineers should be justified in terms of their reasons for existing within society. Autonomy for engineers are justified with reference to the necessity of autonomy for engineers to properly carry out tasks assigned to them

Review 9，10，11

Chapter 9

● explain the nature of loyalty and of legitimate authority and their relation to faithful agency;

nature of loyalty: Corporate employ- ees should endeavor to obey all legitimate, job-related directives.

nature of legitimate authority: Those in positions of au- thority are able to give orders, but engineers are not always obliged to follow all such orders.

Engineers have a **duty of loyalty** to the organizations in which they work, assuming organizational directives are based on **legitimate authority**. Engineers should act as **faithful agents** of the companies for which they work: doing a good job as an employee consists in a relation of faithful agency, taking on the interests of the organization as one's own.

● describe the nature of and give specific examples of **conflicts of interests** [利益冲突];

Nature of conflicts of interests: acting autonomously, based on their duties to the public.

Examples: 1. when engineers have second, 2. part-time jobs, 3. use information learned at their employers for personal gain, 4. are offered gifts or bribes, 5. show favoritism in hiring/subcontracting work. [任选一个即可]

● explain the **different forms** of whistle-blowing[举报] and conditions under which whistle-blowing would be morally permissible and required.

Two forms of whistle-blowing, **internal** and **external**.

Internal whistle-blowing occurs when a hierarchical chain of command within an organization is broken (such that immediate supervisors are bypassed, perhaps because they have refused to act or have themselves been involved in wrongdoing).

External whistle-blowing occurs when information internal to an organization is shared externally (perhaps with regulatory agencies, the press, or public).

Chapter 10

● with regard to the case of Qihoo 360's P1 wireless router, explain why it is important for the public to have an adequate grasp of the ways technologies work and the responsibilities engineers have for this understanding;

Case

● describe the reasons for and problems associated with the gulf in understanding that exists between the sciences-engineering and the humanities-public and what engineers might do to bridge this gap;

1.**scientists** conceive the world in rational terms, where the notion of progress and efficiency dominates. Scientists believe the future lies in their hands and that this future is filled with the wonders of technologies—a view generally associated with “technological optimism.”

2.the **humanities** conceive the world in intuitive terms, where reason can only provide partial and biased answers. The central concerns of the humanities are human meaning and the fulfillment of broader missions.

What to do: **Communication** is necessary, since the future involves everyone. This can only occur if each side is empathetic to the other, explicitly recognizing the value of the other.

● outline the nature of and reasons for ***responsibilities*** that engineers, as a group, have to **public participation**, **education**, and **engagement**, giving examples from the case studies in this chapter;

nature: as a group, engineers have a responsibility to establish communication with nonengineers, insuring that broader nontechnical concerns are considered.

reasons: Such that the responsibility of the group would be fulfilled.

● explain the relationship between laws and ethics, why strictly adhering to laws alone is insufficient, and how engineers might approach the law in international and cross-cultural contexts;

relationship: Having different foundations, laws and ethics are instantiated in different ways.

how: P170页六条lists

● discuss the importance of being sensitive to local needs in the formulation and implementation of international aid work related to engineering and technologies.

importance: This is especially true in international, globalized environments, where a failure to do so can result in wasted time, effort, and money.

Chapter 11

● explain the relationship between duties and rights and the nature of/basis for rights with regard to moral, civic, and employment communities;

relationship between duties and rights: flip side of duties is rights.

nature of rights: A “right” can be understood as an entitlement of an individual.

moral rights: based simply on belonging to a moral community [India dolphins]

civic rights: based on membership in a particular nation or community.

Employee rights: are based on membership in a particular company.

● describe the nature and give examples of both **racial** and **sexual** discrimination, and the **relation** between **rights** and **discrimination**;

sexual discrimination: resulting in negative effects on the abilities of members of that group to perform their jobs.

relation: chief among rights are those protecting individuals from discrimination

● list the rights of employees in general and engineers specifically, and explain problems with and solutions to the enforcement of rights.

List