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