

UNIT – I

Among the universal ethical values are honesty, integrity, promise-keeping, fidelity, fairness, respect for others, responsible citizenship, pursuit of excellence and accountability.

Engineers face several ethical problems in the course of their professional practice. Ethical issues involve:

- a) Public safety
- b) Bribery
- c) Fraud
- d) Environmental protection
- e) Fairness
- f) Honesty in research and testing
- g) Conflicts of interest

The purpose of learning about engineering ethics is to help future engineers be prepared for confronting and resolving ethical issues that they might encounter during their professional careers.

Ethics is the study of characteristics of morals. Ethics also deals with the moral choices that are made by each person in his or her relationships with other persons. Ethics is the society's conception of what constitutes right and wrong.

Engineering ethics is the rules and standards governing the conduct of engineers in their role as professionals.

Engineering ethics is body of philosophy indicating the ways that engineers should conduct themselves in their professional capacity.

Need for engineering ethics:

1. Engineers should gain an increased sense of their professional responsibilities.
2. The technical works of engineers has far reaching impacts on society.
3. The work of engineers can affect public health and safety.
4. It can influence business practices and even politics.

All major corporations these days have an ethics office. The role of ethics office is:

1. Ensure employees have the ability to express their concerns about issues such as safety and corporate business practices in a way that will yield results and won't result in retaliation against the employee.
2. Should foster ethical culture that will help to head off ethical problems in a corporation before they start.

Every engineer must be sensitized about the important ethical issues before he or she has to confront them. Knowledge of engineering ethics shall foster the moral autonomy of future engineers.

Moral autonomy is the ability to think critically and independently about moral issues and apply this moral thinking to situations that arise in the course of professional engineering practice.

Many times ethical problems encountered in engineering practice are very complex and involve conflicting ethical principles.

Engineers should learn to analyze complex problems and also learn to resolve these problems in the most ethical manner.

Ethics in an Engineering Course?

We have been studying engineering, such as design, analysis, and performance measurement.

Where does ethics fit in?

How Ethics Fits into Engineering

- Engineers . . .
 - **Build products** such as cell phones, home appliances, heart valves, bridges, & cars. In general they advance society by building new technology.
 - **Develop processes**, such as the process to convert salt water into fresh water or the process to recycle bottles. These processes change how we live and what we can accomplish.

Products and processes have consequences for society:

- If the bridge has an inadequate support, it will fail.
- If the gas tank is positioned too close to the bumper, it might explode from a small accident.
- If a medical instrument isn't accurate, improper doses of medication can be given.
- If the process for refining gas produces too much toxins, it harms the local community.

- Decisions made by engineers usually have serious consequences to people -- often to multitudes of people.
- Ethics and ethical reasoning guide decision-making.

Reasoning:

The kind of reasoning that goes on in such discussions involves certain goals such as, in this case, health, safety and biodiversity. The reasoning then focuses on finding the best or at least the reasonably better means for obtaining those goals. This type of reasoning is often called practical reasoning. It uses different methods from mathematics and the sciences.

Ethical reasoning is a type of practical reasoning that concerns certain societal or life-form goals.

The Essence of Your Engineering Career:

- Engineering is one of the most important professions in society.
- As engineers we don't just build things and develop processes.
- We build things and make processes in order to better society.
- In order to make society better we have to reflect constantly on the products and processes that we make.

Social responsibility:

- One main connection between ethics and engineering comes from the impact that engineered products and processes have on society.
- Engineers have to think about designing, building, and marketing products that benefit society.
- Social Responsibility requires taking into consideration the needs of society.

Typical Ethical Issues that Engineers Encounter:

- Safety
- Acceptable risk
- Compliance
- Confidentiality
- Environmental health
- Data integrity
- Conflict of interest

- Honesty/Dishonesty
- Societal impact
- Fairness
- Accounting for uncertainty, etc.

Professional Responsibility:

- Ethics has a second connection with engineering.
- It comes from the way in which being socially responsible puts duties and obligations on us individually.
- Ethics fits into engineering through professional responsibility.

Two Dimensions of Ethics in Engineering:

Ethics is part of engineering for two main reasons.

- a) Engineers need to be **socially responsible** when building products and processes for society.
- b) Social responsibility requires **professional responsibility**.

Personal vs. professional ethics:

- Personal ethics deals with how we treat others in our day-to-day lives. Many of these principles are applicable to ethical situations that occur in business and engineering.
- However, professional ethics often involves choices on an organizational level rather than a personal level.
- Many of the problems will seem different because they involve relationships between two corporations, between a corporation and the government, or between corporations and groups of individuals. Frequently, these types of relationships pose problems that are not encountered in personal ethics.

ETHICS AND THE LAW

The practice of engineering is governed by many laws on the international, federal, state, and local levels.

Many of these laws are based on ethical principles, although many are purely of a practical, rather than a philosophical, nature.

There is also a distinction between what is legal and what is ethical. Many things that are legal could be considered unethical. For example, designing a process that releases a known toxic, but unregulated, substance into the environment is probably unethical, although it is legal.

Conversely, just because something is illegal doesn't mean that it is unethical.

For example, there might be substances that were once thought to be harmful, but have now been shown to be safe, that you wish to incorporate into a product. If the law has not caught up with the latest scientific findings, it might be illegal to release these substances into the environment, even though there is no ethical problem in doing so.

As an engineer, you are always minimally safe if you follow the requirements of the applicable laws. But in engineering ethics, we seek to go beyond the dictates of the law. Our interest is in areas where ethical principles conflict and there is no legal guidance for how to resolve the conflict.