

## Nature and Scope of Engineering Ethics

### Introduction:

This division aims to initiate you into the world of morality, ethics, and value, and help understand them better. These concepts need to be understood to formulate the objectives of leading a satisfying and blissful life.

### What is Ethics?

There are many definitions for Ethics - Ethics is branch of Philosophy, particularly moral Philosophy. Ethics cannot be taught. Ethics able to sense what is right, good and bad. Many Professions, such as the fields of medicine, law and education, have developed sets of rules or guidelines that govern the members.

### The Importance of Ethics in Engineering and Science:

The main object of Engineering Ethics is to increase the awareness in engineering failures. Engineering decisions can impact public health, safety, business practices and politics.

**Engineering** (from *Latin ingenium*, meaning “cleverness” and *ingeniare*, meaning “to contrive, devise”) is the application of scientific, economic, social and practical knowledge in order to invent, design, build, maintain, and improve structures, machines, and processes. The discipline of engineering is extremely broad, and encompasses a range of more specialized fields of engineering, each with a more specific emphasis on particular areas of applied science, technology and types of application.

Most students in these disciplines will readily agree that mastering them requires long hours of grueling efforts. These works influence ever one’s life in every corner of the planet. As soon as what we do in our professional lives affects other people, our ethical judgment comes into play as well as our technical judgment.

The prime objective is to increase one’s ability to deal effectively with moral complexity in engineering practice.

Alternatively, the objectives of the study on Professional Ethics may be listed as:

(A) Improvement of the cognitive skills (skills of the intellect in thinking clearly)

1. Moral awareness (proficiency in recognizing moral problems in engineering)
2. Cogent moral reasoning (comprehending, assessing different views)
3. Moral coherence (forming consistent viewpoints based on facts)
4. Moral imagination (searching beyond obvious the alternative responses to issues and being receptive to creative solutions)
5. Moral communication, to express and support one’s views to others.

(B) To *act* in morally desirable ways, towards moral commitment and responsible conduct

6. Moral reasonableness i.e., willing and able to be morally responsible.
7. Respect for persons, which means showing concern for the well-being of others, besides oneself.

8. Tolerance of diversity i.e., respect for ethnic and religious differences, and acceptance of reasonable differences in moral perspectives.
9. Moral hope i.e., believe in using rational dialogue for resolving moral conflicts.
10. Integrity, which means moral integrity, and integrating one's professional life and personal convictions.

### **Ethics according to Aristotle (384-322BC):**

Aristotle was Greek Philosopher and thinker. He considered ethics a practical rather than a theoretical subject; he believed that one should not only aim at becoming good but also doing good for others. He wrote extensively on ethics. His three books that are available are *Nichomachean Ethics*, *Eudemian Ethics*, and *Magna Moralia*.

### **History of Ethics in India:**

Moral consciousness is an undeniable fact of unman Esperance. The moral sensibility is something essential for peaceful society and the work. Even gods are to believe to incarnate to restore righteousness and peace in the society. Ethics as a speculative science is based on the foundations of moral behavior of man, but substantial portion of moral codes are based on religious beliefs, social customs and traditions. It is true that the foundations of Indian ethics can be sought in the metaphysical and the theological beliefs in the form of worship, prayers and in the form of ideals and principles that directed man's life in the society.

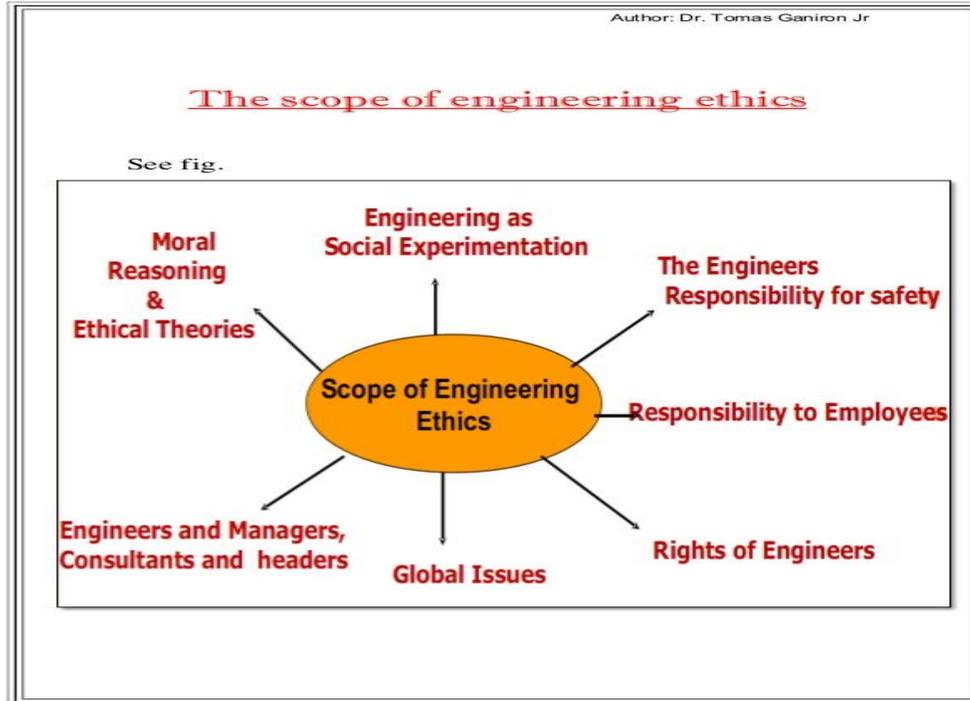
### **Indian Thoughts**

While many ethical principal are mentioned and discussed in the earlier texts and scriptures, one may not find an organized philosophy on ethics in these writings. Many humanistic ideals and virtues or ethical principles are extolled in the Vedas and Upanishads. These include truthfulness, honesty, integrity, philanthropy, gratitude, forgiveness, non-violence, fidelity, and so on.

The *Gita* expounded the concept of right of action without any right for the fruits of that action.

Subsequent period also had writings by *Manu (Manushastras)* and Kautilya (on politics and business) that talk about the way various human activities had to be performed and the ethical aspects of these activities.

## Nature and Scope: Εθoσ [ethos]:



Greek word for custom or habit, characteristic the conduct of an individual human life.

Ethical Issues Faced by Engineers:

- Public safety
- Bribery and Fraud
- Environmental Protection
- Fairness
- Honesty in Research and Testing
- Conflicts of Interest

Ethics are classified as:

- 1) Meta ethics
- 2) Descriptive ethics
- 3) Normative ethics
- 4) Applied ethics

### What is Moral Dilemma?

It is pointless to argue about whether moral dilemmas are possible unless the argues agree about what a moral dilemma is.

In each case, an agent regards herself as having moral reasons to do each of two actions, but doing both actions is not possible. Ethicists have called situations like these *moral dilemmas*. Moral dilemma is a technical term, and different philosophers use it to refer to different situations.

*For Example:* I violate a moral requirement if I kill a person even when this is necessary to prevent him from killing one, since my act would be morally wrong if I did not have this reason to kill him

## **What is Moral Autonomy?**

Moral autonomy is the state of self-governing or self-control moral is the ability to choose right over wrong moral autonomy is the ability to choose right by oneself, without any outside pressure or influence.

In the western tradition, the view that individual autonomy is a basic moral and political value is very much a modern development.

*For Example:* A child comes home from school and tells his mother that the teacher had given him good marks, but it was not true; the teacher had given him no marks at all, either good or bad. Then this mother was very pleased and rewards him.

## **Why Ethical Theories are development?**

1. The role of ethical theories is less dominant in the field of ethical decision making.
2. Only a few ethical decision-making models rely directly on ethical theories.
3. Ethical decision making model according to which the evaluation phase of a decision-making process is carried out through **utilitarian** (practical).

## **Lawrence Kohlberg Theory:**

(October 25, 1927 – January 19, 1987)

He was an American psychologist best known for his theory of stages of moral development. He served as a professor in the Psychology Department at the University of Chicago and at the Graduate School of Education at Harvard University

Lawrence Kohlberg, a developmental psychologist who studied the constructivist theory of Jean Piaget, developed his own series of cognitive development that extended beyond the earlier constructivist theory. His student, Carol Gilligan, contrasted his additions and provided her own justification for the later developments in human cognitive development, which considered gender identity.

He was also inspired by James Mark Baldwin. These men had emphasized that human beings develop philosophically and psychologically in a progressive fashion. He believed...and was able to demonstrate through studies...that people progressed in their moral reasoning (i.e., in their bases for ethical behavior) through a series of stages. He believed that there were six identifiable stages which could be more generally classified into three levels in 1958.

Kohlberg's classification can be outlined in the following manner:

LEVEL	STAGE	SOCIAL ORIENTATION
Pre-conventional	1	Obedience and Punishment
	2	Individualism, Instrumentalism, and Exchange
Conventional	3	"Good boy/girl"
	4	Law and Order
Post-conventional	5	Social Contract
	6	Principled Conscience

*Pre convention:* moral reasoning is based on external rewards and punishments.

*Conventional:* laws and rules are upheld simply because they are laws and rules.

*Post conventional:* reasoning based on personal moral standards.

#### **Level – 1 Pre conventional (Moral Reasoning):**

At the pre-conventional level (most nine-year-old and younger, some over nine), we don't have a personal code of morality. Instead, our moral code is shaped by the standards of adults and the consequences of following or breaking their rules. Authority is outside the individual and reasoning is based on the physical consequences of actions.

• **Stage 1. Obedience and Punishment Orientation.** The child/individual is good in order to avoid being punished. If a person is punished they must have done wrong.

*EXAMPLE:* Tom shouldn't steal the drug because he'd go to jail if he got caught.

• **Stage 2. Individualism and Exchange.** At this stage children recognize that there is not just one right view that is handed down by the authorities. Different individuals have different viewpoints.

*EXAMPLE:* Tom should steal the drug because the druggist is being greedy by charging so much.

#### **Level 2 - Conventional morality**

At the conventional level (most adolescents and adults), we begin to internalize the moral standards of valued adult role models.

Authority is internalized but not questioned and reasoning is based on the norms of the group to which the person belongs.

- **Stage 3. Good Interpersonal Relationships.** The child/individual is good in order to be seen as being a good person by others. Therefore, answers are related to the approval of others.

*EXAMPLE:* Tom should try to steal the drug because that's what a devoted husband would do.

- **Stage 4. Maintaining the Social Order.** The child/individual becomes aware of the wider rules of society so judgments concern obeying rules in order to uphold the law and to avoid guilt.

*EXAMPLE:* Tom should *not steal the* drug because that would be against the law and he has duty to uphold the law.

### **Level 3 - Post-conventional morality**

Individual judgment is based on self-chosen principles, and moral reasoning is based on individual rights and justice (10–15% of adults, not before mid-30s).

- **Stage 5. Social Contract and Individual Rights.** The child/individual becomes aware that while rules/laws might exist for the good of the greatest number, there are times when they will work against the interest of particular individuals. The issues are not always clear cut. For example, in Heinz's dilemma the protection of life is more important than breaking the law against stealing.

*EXAMPLE:* Tom should steal the drug because his obligation to save his wife's life must take precedence over his obligation to respect the druggist's property rights.

- **Stage 6: Universal Principles.** People at this stage have developed their own set of moral guidelines which may or may not fit the law. The principles apply to everyone. E.g. human rights, justice and equality. The person will be prepared to act to defend these principles even if it means going against the rest of society in the process and having to pay the consequences of disapproval and or imprisonment. Kohlberg doubted few people reached this stage.

*EXAMPLE:* Tom should steal the drug even if the person was a stranger and not his wife. He must follow his conscience and not let the druggist's desire for money outweigh the value of a human life.

### **Carol Gilligan Theory:**

Carol Gilligan was born on November 28, 1936, in New York City. She has received her doctorate degree in social psychology from Harvard University in 1964m and began teaching at Harvard in 1967. Then in 1970 she became a research assistant for the great theorist of moral development Kohlberg.

Eventually Gilligan became independent and began to criticize some of Kohlberg's work. Her opinions were presented in her famous book, " In a different Voice: Psychological Theory and Women ' s Development " which was published in 1982. She felt that Kohlberg only studied "privileged, white men

and boys.” Gilligan said that this caused a biased opinion against women. She felt that , in Kohlberg ' s stage theory of moral development, the male view of individual rights and rules was considered a higher stage than women's point of view of development in terms of its caring effect on human relationships. " Gilligan ' s goal is was to prove that women are not " moral midgets " , she was going against many psychological opinions.

Her theory is divided into three stages of moral development beginning from " selfish , to social or conventional morality , and finally to post conventional or principled morality . " Women must learn to deal to their own interests and to the interests of others . She thinks that women hesitate to judge because they see the complexities of relationships

<b>Gilligan's Stages of the Ethic of Care</b>	
<b>Stage</b>	<b>Goal</b>
<i>Preconventional</i>	<i>Goal is individual survival</i>
<b>Transition is from selfishness -- to -- responsibility to others</b>	
<i>Conventional</i>	<i>Self sacrifice is goodness</i>
<b>Transition is from goodness -- to -- truth that she is a person too</b>	
<i>Postconventional</i>	<i>Principle of nonviolence: do not hurt others or self</i>

Background: Women were viewed as deviant and unable to develop into those main factors of development as men

- Care orientation impacts relationships with others and must carry similar weight in reflection of moral decisions
- Idea that the sequence focuses on progressive differentiations

*Pre Conventional*

- Person only cares for themselves in order to ensure survival
- This is how everyone is as children

In this transitional phase, the person's attitude is considered selfish, and the person sees the connection between themselves and others.

### *Conventional*

- Responsibility
- More care shown for other people.
- Gilligan says this is shown in the role of Mother & Wife
- Situation sometimes carries on to ignoring needs of self.

In this transitional phase, tensions between responsibility of caring for others and caring for self are faced.

### *Post Conventional*

- Acceptance of the principle of care for self and others is shown.
- Some people never reach this level.

Gilligan's theory possibly suggests that girls are more concerned about care, while boys are more concerned about justice. This gender debate remains unsettled. The greatest contribution of Gilligan's work is an increased awareness that care is an integral component of moral reasoning.

### **Traits of Real Profession:**

Personality traits are distinguishing qualities or characteristics that are the embodiment of an individual's. They are your habitual patterns of behavior, temperament and emotion.

Skills, on the other hand, are the learned capacity to carry out specific tasks. They are competences or the talents to do things. These proficiencies can include critical thinking, manual, negotiation, outdoor, presentation, or technological. Typically, skills are special abilities that are acquired through training and experience.

The building block of successful career development is comprised of four components: skills, values, interests and personality traits. I have been a practicing career counselor for a long-time, and I have found an abundance of personality traits that are characteristic of successful people. However, the following is my top 10 list. Successful people tend to be/have:

1. ***Attitude*** – The capacity to stay optimistic and positive. The #1 quality for career success is “Championship Thinking.”
2. ***Enthusiastic*** – The possession of intense and eager interest in a subject or cause. It is an energy that often inspires others.
3. ***Ethical*** – The quality of having and living by a code of sound moral principles.

4. **Goal Focused** – The ability to have clarity on the objectives that you strive for in your personal and professional life.
5. **Listener** – The capacity to suspend your own agenda and deliberately and empathically allow others to be heard.
6. **Networked** – A well developed circle of influence of interconnected positive relationships.
7. **Persistent** – The ability to endure in the face of adversity. It is a patient and relenting effort to achieve despite difficulties.
8. **Self-Aware** – The understanding and knowledge of who you are including your skills, values, interests, behaviors and character.
9. **Self-Confident** – The firm belief in your abilities. Seek professional help if this is an area of weakness – it will be worth it.
10. **Self-Discipline** – The ability to control and restrain impulses. Energy then can be focused and channeled toward your ambitions.

### **Moral reasoning:**

Moral = Morality

It concerns conduct: right and wrong, good and bad, the rules that ought to be followed

It is associated with consequences to us, others, and the environment

The “right” or “good” is linked to value judgments’ generally thought to promote fairness, health, and safety while minimizing injustice.

Moral reasoning is a thinking process with the objective of determining whether an idea is right or wrong. **Moral reasoning** is a study in psychology that overlaps with moral philosophy. It is also called moral development. Prominent contributors to theory include Lawrence Kohlberg and Elliot Turiel. The term is sometimes used in a different sense: reasoning under conditions of uncertainty, such as those commonly obtained in a court of law. It is this sense that gave rise to the phrase, "To a moral certainty;" however, this sense is now seldom used outside of charges to juries.

Moral reasoning can be defined as being the process in which an individual tries to determine the difference between what is right and what is wrong in a personal situation by using logic. This is an important and often daily process that people use in an attempt to do the right thing. Every day for instance, people are faced with the dilemma of whether or not to lie in a given situation. People make this decision by reasoning the morality of the action and weighing that against its consequences.

## **Ethical Theories:**

**1. Utilitarianism** - the view that we ought to produce the most good for the most people, giving equal consideration to everyone affected. *Banham* stated the principle of *maximum good to maximum number of people*. Which was later modified to *maximum good*. An action is good if it results in maximum good to people affected by that action. The many questions arising from this theory led to many people criticizing it.

**Rule-Utilitarianism** is applying those rules that if generally adopted would produce the most good for the most people.

**Act-Utilitarianism** is applying rules in order to produce the most good for the most people involved in the particular situation (rules become at most rules of thumb).

Utilitarianism is a consequentiality theory as it judges actions by the results they produce. How to judge the result of an action is a matter of debate in itself. One school of thought recommends act-utilitarianism, which states that an act is good or desirable if it produces maximum good. Richard Brandt is a staunch believer of rule utilitarianism. According to him, if moral codes or rules are framed to maximize the good resulting from following them, then such moral codes are justified.

In utilitarianism, an engineer could also be asked to bend or break a fundamental rule, because this will result in the greatest happiness for the greatest number of people. For example, the engineer has the opportunity to save 10 million euros on a design. But he knows that this will later cause an accident killing 5 people. He argues that 10 million euros can cause more happiness than 5 lives. To compensate for this, rule utilitarianism has been created. This kind of utilitarianism recognizes and uses moral rules. It is thus also similar to duty ethics.

## **2. Rights Theory:**

Rights Ethics - the view that human rights - not good consequences - are fundamental. Acts of respect for human rights are mandatory, regardless of whether they always maximize good. Truthfulness important in terms of its contribution to liberty, especially within relationships based on trust. Complex in that there are many types of rights that may conflict and must be balanced. For example, a person has the right to live and hence others have the duty to not take his/ her life.

In most democratic constitutions, citizens are assigned fundamental rights such as right to speech right to speech and freedom of expression, right to follow a religion of his/her choice, and so on. Any action that violates these rights is unethical. The rights of individualistic and these should be protected. Others have the duty to not interfere with the rights of individuals. Rights theory has many supporters, philosophers like John Locke and A.I.Melden.

According to them bestowing of rights presupposes that the accountable within a moral community. Individual rights cannot be at variance with the rights of others in the community. The importance of this theory arises from the fact that we have to accept the rights and responsibilities of professionals. How an individual balances his/her rights and responsibilities is the key issue in professional.

### **Self-interest:**

**Self-interest** generally refers to a focus on the needs or desires (*interests*) of the self. A number of philosophical, psychological, and economic theories examine the role of self-interest in motivating human action.

#### *In philosophy*

Philosophical concepts concerned with self-interest include: Individualism, a philosophy stressing the worth of individual selves.

- Ethical egoism, the ethical position that moral agents *ought* to do what is in their own self-interest.
- Rational egoism, the position that all rational actions are those done in one's self-interest.
- Hedonism, the school of ethics which argues that pleasure is the only intrinsic good.
- Enlightened self-interest, a philosophy which states that acting to further the interests of others also serves one's own self-interest.

### **Ethical Egoism:**

Ethical egoism is a theory that deals with self-interest. According to this theory, one's actions are ethical if they promote the interest of the person who acts. An obvious inference is that ethical egoism does not respect the rights of others. According to the critics of this theory, ethical egoism will not give permanent happiness to the person following this theory. The pursuits of self-interest resulting in detrimental effects on others are not generally acceptable, and goes against the ethical principles outlined earlier. Proponents of ethical egoism believe that even if a person takes interest in others, his/her own good and self-interest predominate his/her actions.

They are of the view that each individual or a group of individuals should take actions to promote self-interest. Each individual is in the best position to judge what will promote his/herself-interest. He /She should take actions that promote it. Some proponents also find a distinction between very narrow forms of self-interest and wider forms in which the interests of others are also taken care of.

Critics of ethical egoism aver that it is nothing but pure selfishness and will not lead to what the individual aspires for. This theory also goes against promotion of relationships and comradeship.

