**JAYAWANT SHIKSHAN PRASARAK MANDAL'S**
**BHIVARABAI SAWANT INSTITUTE OF TECHNOLOGY & RESEARCH, WAGHOLI, PUNE**
(Approved by AICTE, New Delhi&DTE Maharashtra Govt. Affiliated to SPPU, Pune)

**DTE College Code: 6311**


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## Handbook

# Human Values
# &
# Professional Ethics

**Quality education is the fundamental right of every Indian citizen. Quality Education lays the good foundation for Individual growth. Jayawant Shikshan Prasarak Mandal (JSPM) is committed to impart quality education, to create skilled man power for the nation.**

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## PART-II: Professional Ethics

## About Institute:

**BSIOTR was established by JSPM in 2009 in Wagholi, Pune with the aim of imparting quality technical education. Institute is well recognized by the stakeholders by its core values which emphasize on human values and professional ethics.**

## Vision statement:

**"To provide, nuture and maintain an environment of high academic excellence, research and entrepreneurship for all aspiring students, which will prepare them to face global challenges maintaining high ethical and moral standards."**

## Mission statements:

**"Satisfy the aspirations of youth force, who want to lead nation towards prosperity through techno-economic development."**

**OBJECTIVES:**

## (Engineering Ethics & Human Values)

- To understand the moral values that ought to guide the Engineering profession, Resolve the moral issues in the profession,
- To justify the moral judgment concerning the profession.
- Intended to develop a set of beliefs, attitudes, and habits that engineers should display concerning morality.
- To create an awareness on Engineering Ethics and Human Values.
- To inspire Moral and Social Values and Loyalty.
- To appreciate the rights of others.

The prime objective of the Professional Ethics is to develop ability to deal effectively with moral complexity in engineering students of **Bhivarabai Sawant Institute of Technology & Research,** Wagholi, Pune as follows.

**TO IMPROVEMENT OF THE COGNITIVE SKILLS:**

**(SKILLS OF THE INTELLECT IN THINKING CLEARLY):**

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

**TO ACT IN MORALLY DESIRABLE WAYS:**
**(TOWARDS MORAL COMMITMENT AND RESPONSIBLE CONDUCT):**

- Moral reasonableness i.e., willing and able to be morally responsible.
- Respect for persons, which means showing concern for the well-being of others, besides oneself.
- Tolerance of diversity i.e., respect for ethnic and religious differences, and acceptance of reasonable differences in moral perspectives.
- Moral hope i.e., believes in using rational dialogue for resolving moral conflicts.

- Integrity, which means moral integrity, and integrating one's professional life and personal convictions.

## PART-I
## HUMAN VALUES

### MORALS:

Morals are the welfare principles enunciated by the wise people, based on their experience and wisdom. They were edited, changed or modified rulers (dynasty) according with the development of knowledge in engineering and technology time to time.

Morality is concerned with principles and practices of morals such as: What ought or ought not to be done in a given situation? , What is right or wrong about the handling of a situation? and What is good or bad about the people, policies, and ideals involved?

### VALUES:

Humans have the unique ability to define their identity, choose their values and establish their beliefs. All three of these directly influence a person's behavior. People have gone to great lengths to demonstrate the validity of their beliefs, including war and sacrificing their own life! Conversely, people are not motivated to support or validate the beliefs of another, when those beliefs are contrary to their own. People will act congruent with their personal values or what they deem to be important. **"A value is defined as a principle that promotes well-being or prevents harm." Another definition is: "Values are our guidelines for our success—our paradigm about what is acceptable."** Personal values are defined as: **"Emotional beliefs in principles regarded as particularly favorable or important for the individual."** Our values associate emotions to our experiences and guide our choices, decisions and actions.

### INTEGRITY:

Integrity is defined as the unity of thought, word and deed (honesty) and open mindedness. It includes the capacity to communicate the factual information so that others can make well-informed decisions. It yields the person's 'peace of mind', and hence adds strength and consistency in character, decisions, and actions. This paves way to one's success. It is one of the self-direction virtues. It enthuse people not only to execute a job well but to achieve excellence in performance. It helps them to own the responsibility and earn self-respect and recognition by doing the job. Moral integrity is defined as a virtue, which reflects a consistency of one's attitudes, emotions, and conduct in relation to justified moral values. Integrity comes in many forms, but honesty and dependability are two traits that are expected in most workplace situations. Without

responsible behavior, distrust can make a work environment tense and uncomfortable. A strong work ethic shows co-workers and clients that you're reliable and take your responsibilities seriously. Polite communication, respectable behavior and fiscal responsibility also help you stand out as a trustworthy employee.

**EXAMPLES OF INTEGRITY AT WORKPLACE:**

Work When You're on the Clock: Attending and working diligently when you're on the clock is a clear example of workplace integrity. Socializing, surfing the Internet, making personal phone calls, texting and frequent snacking are activities that detract from work time. Saving those activities for break time will show your boss, co-workers and customers that you work hard when you're on the clock. The career website Calibrate Coaching recommends honoring your work hours by not stealing time from your employer. Even if you don't actually clock in and out with a time card, focusing on your work responsibilities while you're at your desk, work station or production area will showcase your strong work habits.

**Follow Institution Policies:** Abiding by institution policies is a powerful way to demonstrate integrity. Cutting corners and neglecting to follow workplace regulations can lead to mistakes, problems and even dangerous situations. Your willingness to properly record financial transactions, safely dispense of hazardous or toxic materials, follow BSIOTR protocol for dealing with stake holders, perform clean-up or set-up procedures and properly maintain equipment shows others that you're not just looking for the easy way out. Establishing yourself as a trustworthy worker who submits to BSIOTR policies shows your boss and co-employees and students that you'll faithfully carry out your duties.

**Service Learning:** Service-learning seeks to engage individuals in activities that combine both community service and academic learning. Because service-learning programs are typically rooted in formal courses (core academic, elective, or vocational), the service activities are usually based on particular curricular concepts that are being taught. Service-learning is a teaching method which combines community service with academic instruction as it focuses on critical, reflective thinking and civic responsibility. Service-learning programs involve students in organized community service that addresses local needs, while developing their academic skills, sense of civic responsibility, and commitment to the community.

**A Service-Learning Program Provides Educational Experiences:** Under which students learn and develop through active participation in thoughtfully organized service experiences that meet actual community needs and that are coordinated in collaboration with school and community; That are integrated into the students' academic curriculum or provide structured time for a student to think, talk, or write about what the student did and saw during the actual service activity; That provides students with opportunities to use newly-acquired skills and knowledge in real-life situations in their own communities; and That enhance what is taught by extending student learning beyond the classroom and into the community and helps to foster the development of a sense of caring for others.

**SERVICE-LEARNING BENEFITS:**

**Service-Learning benefits students by:**

- Linking theory to practice
- Deepening understanding of course materials
- Enhancing the sense of civic responsibility through civic engagement
- Allowing students to explore possible career paths
- Stressing the importance of improving the human condition
- Developing relevant career-related skills
- Providing experience in group work and interpersonal communication
- Promoting interaction with people from diverse backgrounds
- Instilling a sense of empowerment that enhances self-esteem

**Service-Learning benefits faculty by:**

- Providing exciting new ways to teach familiar material
- Offering professional development challenges
- Engaging faculty in meaningful interactions with the community at large
- Encouraging faculty to form close, interactive, mentoring relationships with students
- Reminding faculty of the direct consequences of their teaching for society
- Connecting faculty across academic disciplines through a shared approach to teaching and learning process.

**CIVIC VIRTUE:**

Civic virtues are the moral duties and rights, as a citizen of the village or the country or an integral part of the society and environment. An individual may exhibit civic virtues by voting, volunteering, and organizing welfare groups and meetings.

**The duties are:**

- ✓ To pay taxes to the local government and state, in time.
- ✓ To keep the surroundings clean and green.
- ✓ Not to pollute the water, land, and air by following hygiene and proper garbage disposal. For example, not to burn wood, tyres, plastic materials, spit in the open, even not to smoke in the open, and not to cause nuisance to the public, are some of the civic (duties) virtues.
- ✓ To follow the road safety rules.

**On the other hand, the rights are:**

- ✓ To vote the local or state government.
- ✓ To contest in the elections to the local or state government.
- ✓ To seek a public welfare facility such as a school, hospital or a community hall or transport or communication facility, for the residents.
- ✓ To establish a green and safe environment, pollution free, corruption free, and to follow ethical principles. People are said to have the right to breathe in fresh air, by not allowing smoking in public.
- ✓ People have inalienable right to accept or reject a project in their area. One has the right to seek legal remedy, in this respect, through public interest petition.

**RESPECT FOR OTHERS:**

This is a basic requirement for nurturing friendship, team work, and for the synergy it promotes and sustains. The principles enunciated in this regard are:

- ✓ Recognize and accept the existence of other persons as human beings, because they have a right to live, just as you have.
- ✓ Respect others' ideas (decisions), words, and labor (actions). One need not accept or approve or award them, but shall listen to them first. One can correct or warn, if they commit mistakes. Some people may wait and watch as fun, if one falls, claiming that they

know others' mistakes before and know that they will fall! Appreciate colleagues and subordinates on their positive actions. Criticize constructively and encourage them. They are bound to improve their performance, by learning properly and by putting more efforts.

- ✓ Show 'goodwill' on others. Love others. Allow others to grow. Basically, the goodwill reflects on the originator and multiplies itself on everybody. This will facilitate collinearity, focus, coherence, and strength to achieve the goals.

**LIVING PEACEFULLY:**

To live peacefully, one should start install peace within (self). Charity begins at home. Then one can spread peace to family, organization where one works, and then to the world, including the environment. Only who are at peace can spread peace. You can't gift an article which you do not possess. The essence of oriental philosophy is that one should not fight for peace. It is oxymoron. War or peace can be won only by peace, and not by wars!

One should adopt the following means to live peacefully, in the world:

## Nurture:

- ✓ Order in one's life (self-regulation, discipline, and duty).
- ✓ Pure thoughts in one's soul (loving others, blessing others, friendly, and not criticizing or hurting others by thought, word or deed).
- ✓ Creativity in one's head (useful and constructive).
- ✓ Beauty in one's heart (love, service, happiness, and peace).

## Get

- ✓ Good health/body
  (Physical strength for service to enjoy the academic environment in the institution).

## Act

- ✓ Help the needy with head, heart, and hands (charity). Service to the poor is considered holier than the service to God.
- ✓ Not hurting and torturing others physically, verbally, or mentally.

**The following are the factors that promote living, with internal and external peace:**

- Conducive environment (safe, ventilated, illuminated and comfortable).
- Secured job and motivated with 'recognition and reward'.
- Absence of threat or tension by pressure due to limitations of money or time.
- Absence of unnecessary interference or disturbance, except as guidelines.
- Healthy labor relations and family situations.
- Service to the needy (physically and mentally-challenged) with love and sympathy.

**CARING:**

Caring is feeling for others. It is a process which exhibits the interest in, and support for, the welfare of others with fairness, impartiality and justice in all activities, among the employees, in the context of professional ethics. It includes showing respect to the feelings of others, and also respecting and preserving the interests of all others concerned. Caring is reflected in activities such as friendship, membership in social clubs and professional societies, and through various transactions in the family, fraternity, community, country and in international councils.

**SHARING:**

Primarily, caring influences 'sharing'. Sharing is a process that describes the transfer of knowledge (teaching, learning, and information), experience (training), commodities (material possession) and facilities with others. The transfer should be genuine, legal, positive, voluntary, and without any expectation in return. However, the proprietary information should not be shared with outsiders. Through this process of sharing, experience, expertise, wisdom and other benefits reach more people faster. Sharing is voluntary and it can't be driven by force, but motivated successfully through ethical principles. In short, sharing is 'charity'

For the humanity, 'sharing' is a culture. The 'happiness and wealth' are multiplied and the 'crimes and sufferings' are reduced, by sharing. It paves the way for peace and obviates militancy. Philosophically, the sharing maximizes the happiness for all the human beings. In terms of psychology, the fear, divide, and distrust between the 'haves' and 'have-nots' disappear. Sharing not only paves the way to prosperity, early and easily, and sustains it. Economically speaking, benefits are maximized as there is no wastage or loss, and everybody gets one's needs fulfilled and

satisfied. Commercially speaking, the profit is maximized. Technologically, the productivity and utilization are maximized by sharing.

**HONESTY:**

Honesty is a virtue, and it is exhibited in two aspects namely,

- Truthfulness
- Trustworthiness.

Truthfulness is to face the responsibilities upon telling truth. One should keep one's word or promise. By admitting one's mistake committed (one needs courage to do that!), it is easy to fix them. Reliable engineering judgment, maintenance of truth, defending the truth, and communicating the truth, only when it does 'good' to others, are some of the reflections of truthfulness. But trustworthiness is maintaining integrity and taking responsibility for personal performance. People abide by law and live by mutual trust. They play the right way to win, according to the laws or rules (legally and morally). They build trust through reliability and authenticity. They admit their own mistakes and confront unethical actions in others and take tough and principled stand, even if unpopular.

Honesty is mirrored in many ways. The common reflections are:

- Beliefs (intellectual honesty).
- Communication (writing and speech).

**COURAGE:**

Courage is the tendency to accept and face risks and difficult tasks in rational ways. Self-confidence is the basic requirement to nurture courage. Courage is classified into three types, based on the types of risks, namely

- Physical courage,
- Social courage, and
- Intellectual courage.

In physical courage, the thrust is on the adequacy of the physical strength, including the muscle power and armaments. People with high adrenalin, may be prepared to face challenges for the mere 'thrill' or driven by a decision to 'excel'. The social courage involves the decisions and

actions to change the order, based on the conviction for or against certain social behaviors. This requires leadership abilities, including empathy and sacrifice, to mobilize and motivate the followers, for the social cause. The intellectual courage is inculcated in people through acquired knowledge, experience, games, tactics, education, and training. In professional ethics, courage is applicable to the employers, employees, public, and the press.

**VALUING TIME:**

Time is rare resource. Once it is spent, it is lost forever. It can't be either stored or recovered. Hence, time is the most perishable and most valuable resource too. This resource is continuously spent, whether any decision or action is taken or not.

The history of great reformers and innovators have stressed the importance of time and valuing time. The proverbs, 'Time and tide wait for nobody' and 'Procrastination is the thief of time' amply illustrate this point.

An anecdote to highlight the 'value of time' is as follows: To realize the value of one year, ask the student who has failed in the examinations;. To realize the value of one month, ask the mother who has delivered a premature baby; to realize the value of one week, ask the editor of weekly; to realize the value of one day, ask the daily-wage laborer; to realize now the value of one hour, ask the lovers longing to meet; to realize the value of one minute, ask a person who has missed the train; to realize the value of one second, ask the person who has survived an accident; to realize the value one milli-second, ask the person who has won the bronze medal in Olympics; to realize the value of one micro second, ask the NASA team of scientists; to realize the value of one nano-second, ask a Hardware engineer!; If you have still not realized the value of time, wait; are you an Engineer?

**COOPERATION:**

It is a team-spirit present with every individual engaged in engineering. Co-operation is activity between two persons or sectors that aims at integration of operations (synergy), while not sacrificing the autonomy of either party. Further, working together ensures, coherence, i.e., blending of different skills required, towards common goals.

Willingness to understand others, think and act together and putting this into practice, is cooperation. Cooperation promotes co linearity, coherence (blend), co-ordination (activities linked

in sequence or priority) and the synergy (maximizing the output, by reinforcement). The whole is more than the sum of the individuals. It helps in minimizing the input resources (including time) and maximizes the outputs, which include quantity, quality, effectiveness, and efficiency.

The impediments to successful cooperation are:

- Clash of ego of individuals.
- Lack of leadership and motivation.

Conflicts of interests, based on region, religion, language, and caste. Ignorance and lack of interest. By careful planning, motivation, leadership, fostering and rewarding team work, professionalism and humanism beyond the 'divides', training on appreciation to different cultures, mutual understanding 'cooperation' can be developed and also sustained.

**COMMITMENT:**

Commitment means alignment to goals and adherence to ethical principles during the activities. First of all, one must believe in one's action performed and the expected end results (confidence). It means one should have the conviction without an iota of doubt that one will succeed. Holding sustained interest and firmness, in whatever ethical means one follows, with the fervent attitude and hope that one will achieve the goals, is commitment. It is the driving force to realize success.

This is a basic requirement for any profession. For example, a design engineer shall exhibit a sense of commitment, to make his product or project designed a beneficial contribution to the society. Only when the teacher (Guru) is committed to his job, the students will succeed in life and contribute 'good' to the society. The commitment of top management will naturally lead to committed employees, whatever may be their position or emoluments. This is bound to add wealth to oneself, one's employer, society, and the nation at large.

**EMPATHY:**

Empathy is social radar. Sensing what others feel about, without their open talk, is the essence of empathy. Empathy begins with showing concern, and then obtaining and understanding the feelings of others, from others' point of view. It is also defined as the ability to put one's self

into the psychological frame or reference or point of view of another, to know what the other person feels. It includes the imaginative projection into other's feelings and understanding of other's background such as parentage, physical and mental state, economic situation, and association. This is an essential ingredient for good human relations and transactions.

**SELF-CONFIDENCE:**

Certainty in one's own capabilities, values, and goals, is self-confidence. These people are usually positive thinking, flexible and willing to change. They respect others so much as they respect themselves. Self-confidence is positive attitude, wherein the individual has some positive and realistic view of himself, with respect to the situations in which one gets involved. The people with self-confidence exhibit courage to get into action and unshakable faith in their abilities, whatever may be their positions. They are not influenced by threats or challenges and are prepared to face them and the natural or unexpected consequences. The self-confidence in a person develops a sense of partnership, respect, and accountability, and this helps the organization to obtain maximum ideas, efforts, and guidelines from its employees. The people with self-confidence have the following characteristics:

- ✓ A self-assured standing
- ✓ Willing to listen
- ✓ To learn from others and adopt (flexibility),
- ✓ Frank to speak the truth
- ✓ Respect others' efforts and give due credit.

**CHARACTER:**

It is a characteristic property that defines the behavior of an individual. It is the pattern of virtues (morally-desirable features). Character includes attributes that determine a person's moral and ethical actions and responses. It is also the ground on which morals and values blossom. People are divided into several categories, according to common tendencies such as ruthless, aggressiveness, and ambition, constricting selfishness, stinginess, or cheerfulness, generosity and goodwill. Individuals vary not only in the type of their character but also in the degree. Those whose lives are determined and directed by the prevailing habits, fashions, beliefs, attitudes,

opinions and values of the society in which they live have at best a developed social as opposed to an individual character. Following types of characters should be followed by the engineers.

- ✓ Active (great and the mediocre), and
- ✓ The apathetic (purely apathetic or dull), and
- ✓ The intelligent.

**SPIRITUALITY:**

Spirituality is a way of living that emphasizes the constant awareness and recognition of the spiritual dimension (mind and its development) of nature and people, with a dynamic balance between the material development and the spiritual development. This is said to be the great virtue of Indian philosophy for Indians. Sometimes, spirituality includes the faith or belief in supernatural power/ God, regarding the worldly events. It functions as a fertilizer for the soil 'character' to blossom into values and morals.

Spirituality includes creativity, communication, recognition of the individual as human being (as opposed to a life-less machine), respect to others, acceptance (stop finding faults with colleagues and accept them the way they are), vision (looking beyond the obvious and not believing anyone blindly), and partnership (not being too authoritative, and always sharing responsibility with others, for better returns).

Spirituality is motivation as it encourages the colleagues to perform better. Remember, lack of motivation leads to isolation. Spirituality is also energy: Be energetic and flexible to adapt to challenging and changing situations. Spirituality is flexibility as well. One should not be too dominating. Make space for everyone and learn to recognize and accept people the way they are. Variety is the order of the day. But one can influence their mind to think and act together. Spirituality is also fun. Working is okay, but you also need to have fun in office to keep yourself charged up. Tolerance and empathy are the reflections of spirituality. Blue and saffron colors are said to be associated with spirituality.

## PART-II
## PROFESSIONAL ETHICS

### INTRODUCTION

Engineers have an ethical and social responsibility to themselves, their clients and society. Practically (although there is much debate about this), engineering ethics is about balancing cost, schedule, and risk. Engineering ethics is a means to increase the ability of concerned engineers, managers, citizens and others to responsibly confront moral issues raised by technological activities. The awareness of moral issues and decisions confronting individuals and organizations are involved in Engineering & Technology.

### ENGINEERING ETHICS: WHY STUDY ENGINEERING ETHICS?

#### ➢ Training In Preventive Ethics:

- Stimulating the moral imagination
- Recognizing ethical issues
- Developing analytical skills
- Eliciting a sense of responsibility
- Tolerating disagreement and ambiguity

#### ➢ Obstruction to Responsibility:

- Self-interest.
- Fear.
- Self-deception.
- Ignorance.
- Egocentric tendencies.
- Microscopic vision.
- Groupthink.

#### ➢ Clearly Wrong Engineering Practices:

- Lying
- Deliberate deception
- Withholding information
- Failing to adequately promote the dissemination of information
- Failure to seek out the truth
- Revealing confidential or proprietary information
- Allowing one's judgment to be corrupted.

## ➢ Questionable Engineering Practices:

- Trimming – "smoothing of irregularities to make data look extremely accurate and precise"
- Cooking – "retaining only those results that fit the theory and discarding others".
- Forging – "inventing some or all of the research data…"
- Plagiarism – misappropriating intellectual property.
- Conflicts of interest (such as accepting gifts.) Actual, Potential, Apparent.

## ➢ Senses of Expression of Engineering Ethics:

- Ethics is an activity and area of inquiry. It is the activity of understanding moral values, resolving moral issues and the area of study resulting from that activity.
- When we speak of ethical problems, issues and controversies, we mean to distinguish them from non-moral problems.
- Ethics is used to refer to the particular set of beliefs, attitudes and habits that a person or group displays concerning moralities.
- Ethics and its grammatical variants can be used as synonyms for 'morally correct'.

**DIFFERENCE IN MORALITY & ETHICS**

| Morality | Ethics |
|---|---|
| • More general and prescriptive based on customs and traditions.<br>• More concerned with the results of wrong action, when done.<br>• Thrust is on judgment and punishment, in the name of God or by laws.<br>• In case of conflict between the two, morality is given top priority, because the damage is more. It is more common and basic.<br>• Example: Character flaw, corruption, extortion, and crime. | • Specific and descriptive. It is a critical reflection on morals.<br>• More concerned with the results of a right action, when not done.<br>• Thrust is on influence, education, training through codes, guidelines, and correction.<br>• Less serious, hence second priority only. Less common. But relevant today, because of complex interactions in the modern society.<br>• Example: Notions or beliefs about manners, tastes, customs, and towards laws. |

**THREE TYPES OF ETHICS:**

## Common Morality:

Common morality is the set of moral beliefs shared by all Engineering students. It is the basis for the other types of morality. In ethics, we usually think of such principles as Ahimsa (no harm physically or mentally to or killing others or even suicides), Satyam (no lies and break of promises), Contentment (no greed, cheating or stealing) etc. We don't question these principles. Three characteristics of common morality are identified as follows:

I. Many of the principles of common morality are negative. The common morality is designed primarily to protect individuals from different types of violations or invasions of their personhood by others, such as killing, lying or stealing.

II. Although the common morality is basically negative, it certainly contains positive or aspirational features in principles such as, 'Prevent killing, Prevent deceit and prevent cheating'. Further it includes even more positive principles, such as 'Help the needy, Promote human happiness, and protect the environment'. This distinction between the positive and negative aspects of common morality will be important in discussing professional ethics.

III. The common morality makes a distinction between an evaluation of a person's actions and of his intentions. An evaluation of action is based on moral principles considered, but an evaluation of the person himself is based on one's intention. For example, if a driver kills a pedestrian with his vehicle accidentally, he may be booked for manslaughter but not murder. The pedestrian is just as dead as if he had been murdered, but the driver's intention was not to kill him. The law treats the driver differently, as long as one was not reckless. The end result maybe the same, but the intent is different. He may be morally responsible but not legally for the death. Similarly, if you convey false information to another person with the intent to deceive, you are lying. If you convey the same false information because you do not know any better, you are not lying and not usually as morally culpable. Again, the result is the same (misleading the person), but the intent is different.

**Personal Morality:**

Personal ethics or personal morality is the set of moral beliefs that a person holds. Our personal moral beliefs mostly and closely run parallel to the principles of common morality, such as ahimsa, satyam and contentment. But our personal moral beliefs may differ from common morality in some areas, especially where common morality appears to be unclear or in a state of change. Thus, we may oppose abortion, even though common morality may not be clear on the issue.

**Professional Ethics:**

Professional ethics is the set of standards adopted by professionals. Every profession has its professional ethics: medicine, law, pharmacy etc. Engineering ethics is the set of ethical standards that applies to the engineering profession. Some of the important characteristics of professional ethics are:

- **Formal code:** Unlike common morality and personal morality, professional ethics is usually stated in a formal code. Many such codes are promulgated by various components of the profession.
- **Focus:** The professional codes of ethics of a given profession focus on the issues that are important in that profession. Professional codes in the legal profession concern themselves with questions such as perjury of clients and the unauthorized practice of law.
- **Precedence:** In a professional relationship, professional ethics takes precedence over personal morality. This characteristic has an advantage, but it can also produce complications. The advantage is that a client can justifiably have some expectations of a professional, even if the client has no knowledge of the personal morality of the professional.
- **Restriction:** The professional ethics sometimes differs from personal morality in its degree of restriction of personal conduct. Sometimes professional ethics is more restrictive than personal morality, and sometimes it is less restrictive.
- **Two dimensional:** Professional ethics, like any ethics, has a negative as well as a positive dimension. Being ethical has two aspects: (*a*) preventing and avoiding evil, and (*b*) doing or promoting good.

- **Role morality**: This means the moral obligations based on special roles and relationships. For example, Parents having a set of obligations to their children, such as not to harm their children, nourish them and promote their flourishing. A political leader has a role morality, the obligation to promote the well-being of citizens. Professional ethics is one of the examples of role morality.

**WORK ETHIC:**

Work ethics is defined as a set of attitudes concerned with the value of work, which forms the motivational orientation. It is a set of values based on hard work and diligence. It is also a belief in the moral benefit of work and its ability to enhance character. A work ethic may include being reliable, having initiative, or pursuing new skills. The 'work ethics' is aimed at ensuring the economy (get job, create wealth, earn salary), productivity (wealth, profit), safety (in workplace), health and hygiene (working conditions), privacy (raise family), security (permanence against contractual, pension, and retirement benefits), cultural and social development (leisure, hobby, and happiness), welfare (social work), environment (anti-pollution activities), and offer opportunities for all, according to their abilities, but without discrimination.

Workers exhibiting a good work ethic in theory should be selected for better positions, more responsibility and ultimately promotion. Workers who fail to exhibit a good work ethic may be regarded as failing to provide fair value for the wage the employer is paying them and should not be promoted or placed in positions of greater responsibility. Work ethic is not just hard work but also a set of accompanying virtues, whose crucial role in the development and sustaining of free markets.

**SENSES OF ENGINEERING ETHICS:**

The word ethics has different meanings but they are correspondingly related to eachother. In connection with that, Engineering ethics has also various senses which are related to one another. Comparison of the senses of Ethics and Engineering Ethic:

| Ethics | Engineering Ethics |
|---|---|
| • Ethics is an activity which concerns with making investigations and knowing about moral values, finding solutions to moral issues and justifying moral issues and justifying moral judgments | • Like the ethics, engineering ethics also aims at knowing moral values related to engineering, finding accurate solutions to the moral problems in engineering and justifying moral judgments of engineering. |
| • Ethics is a means of contrasting moral questions from non-moral problems. | • Engineering Ethics gives a total view of the moral problems and how to solve these issues specifically related to engineering field |
| • Ethics is also used as a means of describing the beliefs, attitudes and habits related to an individual's or group's morality. Eg. : Ethics given in the Bhagavat Gita or the Bible or the Quran. | • Engineering ethics is also using some currently accepted codes and standards which are to be followed by group of engineers and engineering societies |
| • As per the definition of dictionaries – 'moral principles' is about the actions and principles of conduct of the people. i.e. ethical or unethical. | • Engineering ethics also concerns with discovering moral principles such as obligation, rights and ideals in engineering and by applying them to take a correct decision. |

**VARIETY OF MORAL ISSUES:**

There are so many engineering disasters which are greater / heavier than the level of acceptable or tolerable risk. Therefore, for finding and avoiding such cases such as nuclear plant accident at Chernobyl (Russia), **Chemical plant at Bhopal (India)**where a big disaster of gas leakage occurred in 1980, which caused many fatal accidents. In the same way, oil spills from some oil extraction plants (the Exxon Valdez plant), hazardous waste, pollution and other related services, natural disasters like floods, earthquake and danger from using asbestos and plastics are some more cases for engineering disasters. These fields should be given awareness of engineering

ethics. Hence, it is essential for engineers to get awareness on the above said disasters. They should also know the importance of the system of engineering. When malfunction of the system is a rapid one, the disaster will be in greater extent and can be noticed immediately. When they ate slow and unobserved, the impact is delayed. So, the engineers should not ignore about the functions of these systems. These cases also explain and make the engineers to be familiar with the outline of the case in future and also about their related ethical issues.

**APPROACHES TO ENGINEERING ETHICS:**

**Micro-Ethics:** This approach stresses more about some typical and everyday problems which play an important role in the field of engineering and in the profession of an engineer.

**Macro-Ethics:** This approach deals with all the social problems which are unknown and suddenly burst out on a regional or national level.

So, it is necessary for an engineer to pay attention on both the approaches by having a careful study of how they affect them professionally and personally. The engineers have to tolerate themselves with the everyday problems both from personal and societal point of view.

**Some cases with which different areas covered by engineering ethics:**

An inspector finds a faulty part in the manufacture of a machine, which prevents the use of that machine for a longer period. But his superior, takes this as a minor mistake and orders that the faulty part to be adjusted so that the delay in the process has to be avoided. But the inspector doesn't want this and so he is threatened by the supervisor.

An electronic company applies for a permit to start a Nuclear Power Plant. When the licensing authority comes for visit, they enquire the company authorities on the emergency measures that have been established for safety of the surroundings. The engineers inform them about the alarm system and arrangements have been made in local hospitals for the treatment of their employees and they have no plan for the surrounding people. They also inform that it is the responsibility of the people. A Yarn Dyeing company which dumps its wastes in the nearby river. It causes heavy damage to the people those who are using the river. The plant engineers are aware of this, but they do not change the disposal method because their competitors also doing similarly as it happens to be a cheaper. They also say that it is the responsibility of the local government.

The above given examples clearly explain how the ethical problems arise mostoften because of wrong judgments and expectations of engineers. These necessitate for establishing some codes of conduct which has to be imposed on engineers' decisions on the basis of ethical view.

**TYPES OF INQUIRY:**

Inquiry means an investigation. Like general ethics, Engineering ethics also involves investigations into values, meaning and facts. These inquiries in the field of Engineering ethics are of three types.

- Normative Inquiries
- Conceptual Inquiries
- Factual or Descriptive Inquiries

**Normative Inquiries:**

- How do the obligations of engineers protect the public safety in given situations?
- When should an engineer have to alarm their employers on dangerous practices?
- Where are the laws and organizational procedures that affect engineering practice on moral issues?
- Where are the moral rights essential for engineers to fulfill their professional obligations?

From these questions, it is clear that normative inquiries also have the theoretical goal of justifying moral judgments.

**Conceptual Inquiries:**

- What is the safety and how it is related to risk?
- What does it mean when codes of ethics say engineers should protect the safety, health and welfare of the public?
- What is a 'bribe'?
- What is a 'profession' and 'professional'?

These are meant for describing the meaning of concepts, principles, and issues related to Engineering Ethics. These inquiries also explain whether the concepts and ideas are expressed by single word or by phrases. The following are some of the questions of conceptual inquiries

**Factual or Descriptive Inquiries:**

These help to provide facts for understanding and finding solutions to value based issues. The engineer has to conduct factual inquiries by using scientific techniques. These help to provide information regarding the business realities such as engineering practice, history of engineering profession, the effectiveness of professional societies in imposing moral conduct, the procedures to be adopted when assessing risks and psychological profiles of engineers. The information about these facts provides understanding and background conditions which create moral problems. These facts are also helpful in solving moral problems by using alternative ways of solutions.

These types of inquiries are said to be complementary and interrelated. Suppose an engineer wants to tell a wrong thing in an engineering practice to his superiors, he has to undergo all these inquiries and prepare an analysis about the problem on the basis of moral values and issues attached to that wrong thing. Then only he can convince his superior. Otherwise his judgment may be neglected or rejected by his superior

**MORAL DILEMMAS:**

Dilemmas are situations in which moral reasons come into conflict, or in which the application of moral values are problems, and one is not clear of the immediate choice or solution of the problems. Moral reasons could be rights, duties, goods or obligations. These situations do not mean that things had gone wrong, but they only indicate the presence of moral complexity. This makes the decision making complex. For example, a person promised to meet a friend and dine, but he has to help his uncle who is involved in an accident — one has to fix the priority.

There are some difficulties in arriving at the solution to the problems, in dilemma. The three complex situations leading to moral dilemmas are:

1. The problem of vagueness: One is unable to distinguish between good and bad (right or wrong) principle. Good means an action that is obligatory. For example, code of ethics specifies that one should obey the laws and follow standards. Refuse bribe or accept the gift, and maintain confidentiality
2. The problem of conflicting reasons: One is unable to choose between two good moral solutions. One has to fix priority, through knowledge or value system.
3. The problem of disagreement: There may be two or more solutions and none of them

mandatory. These solutions may be better or worse in some respects but not in all aspects. One has to interpret, apply different morally reasons, and analyze and rank the decisions. Select the best suitable, under the existing and the most probable conditions.

**MORAL AUTONOMY:**

Moral autonomy is defined as, decisions and actions exercised on the basis of moral concern for other people and recognition of good moral reasons. Alternatively, moral autonomy means 'self-determinant or independent. The autonomous people hold moral beliefs and attitudes based on their critical reflection rather than on passive adoption of the conventions of the society or profession. Moral autonomy may also be defined as a skill and habit of thinking rationally about the ethical issues, on the basis of moral concern. Viewing engineering as social experimentation will promote autonomous participation and retain one's professional identity. Periodical performance appraisals, tight-time schedules and fear of foreign competition threatens this autonomy. The attitude of the management should allow latitude in the judgments of their engineers on moral issues. If management views profitability is more important than consistent quality and retention of the customers that discourage the moral autonomy, engineers are compelled to seek the support from their professional societies and outside organizations for moral support. It appears that the blue-collar workers with the support of the union can adopt better autonomy than the employed professionals. Only recently the legal support has been obtained by the professional societies in exhibiting moral autonomy by professionals in this country. The engineering skills related to moral autonomy is listed as follows:

- ✓ Proficiency in recognizing moral problems in engineering and ability to distinguish as well as relate them to problems in law, economics, and religion,
- ✓ Skill in comprehending, clarifying, and critically-assessing arguments on different aspects of moral issues,
- ✓ Ability to form consistent and comprehensive view points based on facts,
- ✓ Awareness of alternate responses to the issues and creative solutions for practical difficulties,
- ✓ Sensitivity to genuine difficulties and subtleties, including willingness to undergo and tolerate some uncertainty while making decisions,

- ✓ Using rational dialogue in resolving moral conflicts and developing tolerance of different perspectives among morally reasonable people,
- ✓ Maintaining moral integrity.

Autonomy which is the independence in making decisions and actions is different from authority. Authority provides freedom for action, specified within limits, depending on the situation. Moral autonomy and respect for authority can coexist. They are not against each other. If the authority of the engineer and the moral autonomy of the operator are in conflict, a consensus is obtained by the two, upon discussion and mutual understanding their limits.

**KOHLBERG'S THEORY:**

Moral development in human being occurs overage and experience. Kohlberg suggested there are three levels of moral development, namely pre-conventional, conventional, and post-conventional, based on the type of reasoning and motivation of the individuals in response to moral questions. In the pre-conventional level, right conduct for an individual is regarded as whatever directly benefits oneself. At this level, individuals are motivated by obedience or the desire to avoid punishment or to satisfy their own needs or by the influence by power on them. All young children exhibit this tendency. At the conventional level, people respect the law and authority. Rules and norms of one's family or group or society is accepted, as the standard of morality. Individuals in this level want to please or satisfy, and get approval by others and to meet the expectations of the society, rather than their self interest (e.g., good students). Loyalty is regarded as most important. Many adults do not go beyond this level.

At the post-conventional level, people are called *autonomous*. They think originally and want to live by universally good principles and welfare of others. They have no self-interest. They live by principled conscience. They follow the golden rule, 'Do unto others as you would have them do unto you'. They maintain moral integrity, self-respect and respect for others. Kohlberg believed that individuals could only progress through these stages, one stage at a time. He believed that most of the moral development occurs through social interactions.

## CONSENSUS AND CONTROVERSY:

Consensus means ‘agreement’ and ‘controversy’ means disagreement. The consensus and the controversies are playing the vital roles while considering the moral autonomy; he may not be able to attain the same results as other people obtain in practicing their moral autonomy. Here there might be some differences in the practical application of moral autonomy. This kind of controversies i.e., disagreements are inevitable. Since exercising moral autonomy is not as precise and clear-cut as arithmetic, therefore the moral disagreements are natural and common. So in order to allow scope for disagreement, the tolerance is required among individuals with autonomous, reasonable and responsible thinking. According to the principle of tolerance, the objective of teaching and studying engineering ethics is to discover ways of promoting tolerance in the exercise of moral autonomy by engineers.

Thus the goal of teaching engineering ethics is not merely producing always a unanimous moral conformity; it is about finding the proper ways and means for promoting tolerance in the practical applications of moral autonomy by engineers. In a way, the goal of courses on engineering ethics and goals of responsible engineering have some similarities. Both situations require the need for some consensus regarding the role of authority.

### Relationship between Autonomy and Authority:

Moral autonomy and respect for authority are compatible with each other. Exercising moral autonomy is based on the moral concern for other people and recognition of good moral reasons. Also moral autonomy emphasizes the capabilities and responsibilities of people. Authority provides the framework through which learning attitudes are encouraged. Sometimes, conflicts will arise between individual need for autonomy and the need for consensus about authority. This situation can be rescued by having open and frank discussion regarding a moral issue with the help of authority. Consider the relationship between autonomy and authority, with referenceto a classroom. In the classroom, the teachers have authority over students. Authority of the teachers helps in maintaining the dignity and decorum of academic climate in a institution; also in restoring the confidence and respect between teachers and students. As per the first point, there should be the acceptance of authority of authority by both the teachers and students, in order to conduct the classes in orderly ways. When the authority is misused, conflicts may arise between autonomy and

authority. As per the second point, allowing open discussions between teachers and students can reduce the unhealthy academic atmosphere.

**MODELS OF PROFESSIONAL ROLES:**

It is understood that an engineer has to play many roles while exercising his professional obligations. Some of the professional roles or models are given below:

- **Engineers as Saviors**
- ✓ It is believed that engineers hold the key for any improvements in society through technological developments. Thus some people consider engineer as a savior because they redeem society from poverty, inefficiency, waste and the hardships drudgery of manual labor.
- **Engineers as Guardians**
- ✓ Engineers know the direction in which technology should develop and the speed at which it should move. Thus many people agree the role of engineers as guardians, as engineers guard the best interests of society.
- **Engineers as Bureaucratic Servants**
- ✓ The engineer's role in the management is to be the servant who receives and translates the directives of management into solid accomplishments.
- ✓ Thus the engineers act as a bureaucratic servants i.e., loyal organizations set by the management.
- **Engineers as Social Servants**
- ✓ As we know, engineers have to play the role of social servants to receive society's directives and to satisfy society's desires.
- **Engineers as Social Enablers and Catalysts**
- ✓ Besides merely practicising the management's directives, the engineers have to play arole of creating a better society. Also they should act as catalysts for making social changes.
- ✓ Sometimes engineers have to help the management and the society to understand their needs and to make decisions about desirable technological development.
- **Engineers as Game Players**
- ✓ In actual practice, engineers are neither servants nor masters of anyone. In fact, they play the economic game rules, which may be effective at a given time.

- ✓ Like managers, the engineers aim is also to play successfully within the organization and moving ahead in a competitive world.

**THEORIES ABOUT RIGHT ACTION:**

The main objectives of right action are;

- To understand the distinction between a theory of Right and a theory of Good.
- To understand Utilitarianism, Ethical Egoism, and Consequentialism
- To Know how rule utilitarianism differs from act utilitarianism;

"Utilitarianism is the moral philosophy putting that at the center of things. It concentrates upon general well-wishing or benevolence, or solidarity or identification with the pleasure and pain or welfare of people as a whole. The good is identified with the greatest happiness of the greatest number, and the aim of action is to advance the good (this is known as the principle of Utility). We should always do whatever will produce the greatest possible balance of happiness over unhappiness for everyone who will be affected by our action. Utilitarianism is often summed up as doing 'the greatest good for the greatest number."

Theories of Rights Action are philosophical concepts concerned with human nature and their rights and duties to lead the life with ethical values. The concepts mainly focus on individual person's actions and their consequences. There are different versions of rights action introduced by difference ethicists during the eighteen-century Enlightenment Era: utilitarianism; rights ethics, and duty.

Our task here is to define the concept of Rights Action. We may have different perspectives and understanding of the concepts. After having learnt the concepts: utilitarianism; liberty rights; welfare rights; and duty ethics we can theorize the concept of Right Action as the followings:

- ✓ Right action is the action which controls by law
- ✓ Right action considers to good consequences of action
- ✓ Right action is the action which is benefits to all students, teachers, society, industry etc.
- ✓ Right action is the consequences of action that is not violate the moral rule.

Other definitions: a right action is an act that is permissible for you to do. It may be either: a). an obligation act- is one that morality requires you to do, b). an optional act- an act not obligatory or wrong to do; it is not your duty.

**SELF-INTEREST:**

Self-interest is being good and acceptable to oneself. It is pursuing what is good for oneself. It is very ethical to possess self-interest. As per utilitarian theory, this interest should provide for the respect of others also. Duty ethics recognizes this aspect as duties to ourselves. Then only one can help others. Right ethicist stresses our rights to pursue our own good. Virtue ethics also accepts the importance of self-respect as link to social practices.

In Ethical Egoism, the self is conceived in a highly individualistic manner. It says that every one of us should always and only promote one's own interest. The ethical egoists do not accept the well-being of the community or caring for others. However this self-interest should not degenerate into egoism or selfishness, i.e., maximizing only own good in the pursuit of self-interest. The ethical egoists hold that the society benefits to maximum when (*a*) the individuals pursue their personal good and (*b*) the individual organizations pursue maximum profit in a competitive enterprise. This is claimed to improve the economy of the country as a whole, besides the individuals. In such pursuits, both individuals and organizations should realize that independence is not the only important value. We are also interdependent, as much as independent. Each of us is vulnerable in the society. Self-respect includes recognition of our vulnerabilities and interdependencies. Hence, it is compatible with caring for ourselves as well as others. Self-interest is necessary initially to begin with. But it should be one of the prime motives for action; the other motive is to show concern for others, in the family as well as society. One's self-interest should not harm others. The principles of 'Live and let (others) live', and 'reasonably fair competition' are recommended to professionals by the ethicists

**CUSTOMS AND RELIGION:**

As we live in a society which is of increasingly diverse nature, it is more important to have tolerance for various customs and outlooks. Hence the concept of ethical pluralism emerges. It views that there may be alternative moral attitudes that are reasonable. But none of the moral perspectives can be accepted completely by all the rational and the morally concerned persons. Ethical pluralism allows the customs which plays an important role in deciding how we should act.

Moral values are many, varied and flexible. So, these moral values allow considerable variation in how different individuals and groups understand and apply them in their day-today activities. In other words, to be precise, reasonable persons always have reasonable disagreement on moral issues, including issues in engineering ethics. Ethical Relativism, an objectionable view, should not be confused with Ethical Pluralism. As per Ethical relativism says that actions are morally right when they are approved by law or custom and they are said to be wrong when they violate laws or customs. Ethical relativism tries to reduce moral values to laws, conventions and customs of societies.

**What is the necessary for a person to accept ethical relativism? There are so many reasons for accepting ethical relativism –**

The laws and customs seem to be definite, real and clear – cut. They help to reduce the endless disputes about right and wrong. Moreover, laws seem to be an objective way to approach values. The above argument is somewhat weak. This reason underestimates the extent to which ordinary moral reasons are sufficiently objective to make possible criticism of individual prejudice and bias.

Moreover, moral reasons allow objective criticism of the given laws as morally inadequate. The second reason for accepting ethical relativism is because it believes the values are subjective at the cultural level. They also state that the moral standards are varied from one culture to another. The only kind of objectivity is relative to a given set of laws in a given society. This relativity of morality encourages the virtue of tolerance of difference among societies.

**USES OF ETHICAL THEORIES:**

Ethical theories have so many uses. Out of them, the following three are the most important uses:

- ✓ Understanding moral dilemmas.
- ✓ Justifying professional obligations and ideas.
- ✓ Relating ordinary and professional morality.

“It Is Always Better To Be Recognized As Human Being”