MODULE 1

Prepared by

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Module 1 – Human Values.

Morals, values and Ethics – Integrity- Academic integrity-Work Ethics- Service Learning- Civic Virtue- Respect for others- Living peacefully- Caring and Sharing- Honestly- courage-Cooperation commitment- Empathy-Self Confidence -Social Expectations.

1. M Govindarajan, S Natarajan and V S Senthil Kumar, Engineering Ethics, PHI Learning Private Ltd, New Delhi,2012.

2. R S Naagarazan, A text book on professional ethics and human values, New age international (P) limited ,New Delhi,2006.

Professional ethics

Professional ethics are the desired norms of behaviour exclusively dealing with commercial transactions. A [redacted]

[redacted] A manager with personal integrity is more likely to make ethical decisions for the organization. It is paradoxical that [redacted]. A good business manager is aware of public (consumer) interest, professional interest and organizational interest, and act in accordance with law and ethics.

1.1 MORALS, VALUES AND ETHICS

1.1.1 Morals

Morals are more like principles, based on teachings and often guided by societal and religious standards. Morals refer to the way in which people behave in relationships and in wider society.

1.1.2 Values

Values are the rules by which we make decisions about right and wrong, should or shouldn't, and good or bad.

1.1.3 Ethics

Ethics is the study of the characteristics of morals. Ethics is defined as 'the discipline dealing with what is good and bad and with moral duty and obligation'. Personal ethics deals with how we treat others in our day-to-day lives. Ethics also deals with the moral choices that are made by each person in his or her relationship with other persons. Professional ethics often involve choices on an organizational level rather than a personal level.

Morality is different from Ethics in the following ways:

Morality	*Ethics*
1. More general and prescriptive based on customs and traditions.	1. Specific and descriptive. It is a critical reflection on morals.
2. More concerned with the results of wrong action, when done.	2. More concerned with the results of a right action, when not done.
3. Thrust is on judgment and punishment, in the name of God or by laws.	3. Thrust is on influence, education, training through codes, guidelines, and correction.
4. In case of conflict between the two, morality is given top priority, because the damage is more. It is more common and basic.	4. Less serious, hence second priority only. Less common. But relevant today, because of complex interactions in the modern society.
5. Example: Character flaw, corruption, extortion, and crime.	5. Example: Notions or beliefs about manners, tastes, customs, and towards laws.

Values

Values mean an in-built mechanism that distinguishes the right from the wrong. This should be interpreted in the context of the social environment in which a person lives, moves and acts.

Values serve the process of 'becoming', in the sense of transformation of the level of consciousness to purer, higher levels. Values are subjective while skills are objective. While education is more germane to values, training relates more closely to skills.

Values are something we qualify as 'good' and are prepared to set as our goals in life. The concept of values describes that part of our goals which is not immediately necessary for survival. When two different goals come

Classification of Human Values

Human values can be classified as follows:

1. Values relating to an individual (good or bad) that is related to the person
2. Values where there is normally an element of consensus implied as in terms, such as fair, decent and tolerant
3. Values relating primarily to things in the sense of 'fitting', such as good pen or good computer

With reference to the first two types of values, there are two separate and important aspects:

(a) How does each culture establish its current, commonly accepted values?

(b) How does each person acquire the values that are unique for him or her, given that all individual items must inevitably be strongly coloured and broadly determined by the culture in which he or she was born and bred?

Decision making of management of an organization by values!!!

Management by values highlights the concept of 'self' in man. The ethical quality of managerial decision making can be improved through a full understanding and internalization of the doctrine of karma. All decisions depend critically on the purity of mind of the decision maker. The virtues held in high esteem are simplicity, sacrifice, renunciation and compassion.

Universal Values

There are five systems values or virtues that come from these. They contain all that makes a human being noble, caring and kind.

- **Right conduct:** Right conduct is concerned with maintenance of the body to serve us in performing the tasks of life.
- **Peace:** When the will power is sufficiently strong to discern the differences between real needs and superfluous desires, we cease to be driven by the urge to own more and more things. Inner agitation stops and we remain peaceful.
- **Truth:** Learning to speak the truth is a first and vital step in the formation of a strong character. Voicing untruth is an anti-social act and causes confusion in the minds of both the speaker and listener. Telling lies hurts ourselves and others in a subtle but real way.

- **Love:** Love is a spontaneous reaction of the heart. It is the power of love which causes one person to wish happiness for another and take pleasure in his or her well-being. Love is unconditional, positive and regard for the good of another. Love is the unseen undercurrent binding all the four values.

- **Non-violence:** Non-violence can be described as a universal love. This creates harmony with the environment. That is living in a way that causes as little harm as possible to one-self, other people, animals, plants is a sign of a well-integrated and well-balanced personality.

Fundamental Values

Indians have developed four fundamental values about human life which they have been practicing throughout the ages:

1. Essential divinity inherent in all life
2. Presence of divine motherhood in all women
3. Religion is the manifestation of the divinity already in man. The plurality of religion is only on the surface. At the spiritual core, there is an essential unity of all of them.
4. Civilization is the manifestation of divinity in man. That society is the most developed where the highest truths becomes practical. The end of all work is to bring out the divine in ourselves by serving the divine in others.

1.2 INTEGRITY

The person of integrity has convictions and commitments, but he is not an obstinate person because the person of integrity needs to get along with others. Integrity involves the discovery and communication of truth to enable others make informed decisions. Honesty and integrity are essential for the development of trust. It leads to consistency of character and operation in different situations and contexts. An individual's personal attributes should remain consistent. He should not behave in a different manner when there is nobody around. Providence is there.

1.3 WORK ETHICS

Organizational environment should foster ethical decision making by institutionalizing ethics. This means applying ethical concepts in daily action. This can be accomplished in three ways: (a) by establishing an appropriate company policy or a code of ethics (b) by using a formally appointed ethics committee and (c) by teaching ethics in management development programs. Attention to ethics has substantially improved society. It is true that ethical programmes help maintain a moral course in turbulent times.

Indian work-ethos of life believe that all works, be it physical or mental, management, leadership, and administration have to be directed towards a single purpose—the manifestation of the essential divinity in man by working for the good of all beings.

1.4 SERVICE AND LEARNING

Service is an act of help or assistance when somebody is in distress. May be social service or any assistance at personal level. For some people service-oriented attitude is in-born and others can learn to serve (service). Service could also mean a department of public employment like Civil service.

Learning means the act of gaining knowledge by study, instruction or scholarship. Moral concern involves a commitment to obtain and properly assess all available information pertinent to meeting one's moral obligation. Engineers must be well informed at every stage of the project's history.

1.5 CIVIC VIRTUE

Virtue is a quality of character that allows one to succeed at the roles and activities one undertakes. An excellence of character not just for us, or for narrowly defined contexts, but for the larger social scheme of things. Virtues are pervasive traits of character that allows us to fit into a particular society.

1.6 RESPECT FOR OTHERS

People should always be respected as autonomous (self-directing) moral agents. We use people merely as things when we do not let them make their own decisions and when we harm them for our own benefit without respect for their rights. Moral reasons involve respecting persons by being fair and just with them, respecting their rights, keeping promises, avoiding unnecessary offense and pain to them, and avoiding cheating and dishonesty. They also concern with caring for others by being sometimes willing to help them (especially when they are in distress), showing gratitude for favours, and empathizing with their suffering.

1.7 LIVING PEACEFULLY

When there is peace in the individual, there will be peace in the family. In order to learn how to lead a peaceful living, self-esteem, calmness and freedom from anxieties are necessary.

1.8 CARING AND SHARING

Caring for other persons (including all living beings) and sharing their sorrows and happiness is the heart of the moral life and that a morality of care leads to a refreshingly new picture of morality as centering on relationships, feelings, and connectedness rather than impartiality, justice, and fairness. The justice-oriented person in a moral dispute will ask what is the fair thing to do and then proceed to follow that course of action, no matter what effect that has on others. The care-oriented individual, on the other hand, will try to find the course of action which best preserves the interests of all involved and which does the least amount of damage to the relationships involved.

1.9 HONESTY

The quality of trustworthiness—not given to lying, cheating or stealing. It is characterized by sincerity and candor.

1.10 COURAGE

Courage is a virtue necessary to a wide range of human activities and those who lack courage will rarely flourish. Courage is the strength of character to face and overcome what we fear. Fears differ from person to person, but we all have them. Some may fear physical danger; some may fear intimacy and the psychological vulnerability that comes with it; some may fear commitment; some may fear taking risks to gain what they desire.

Virtues are usually a mean between two extremes. One of the extremes here is clear: cowardice. The other extreme is too much courage (rashness, foolhardiness). To run into a burning building to save a trapped child is courage; to run into the same building to save an old pair of shoes is foolhardy.

1.11 VALUE TIME

Time is viewed as an asset with a perishable value. It is also assumed to be a linear entity which when utilized improperly or inefficiently is wasted. People are socialized to value punctuality and promptness and express strong disapprovals towards tardiness and excessive delays.

1.12 COOPERATION

Healthy competition is a powerful motive behind all kinds of success. Today's biological scientists have proved that it is cooperation and striving for excellence that lead to all round success and not mere atavistic competition which suits the sense-bound animals and not mind-thought-based man. The pattern of non-competition is typical of all naturally co-existing species. Peaceful co-existence, not struggle is the rule. Even at the social level too much competition to keep up the higher standard of living have wrought social havoc. The spirit of cut-throat competition for acquiring only wealth has led to accumulation of more and more wealth at the cost of law or ethics. Competition comes between similar performers. It is avoided when one can show natural excellence on others or when one can manifest something unique.

1.13 COMMITMENT AND EMPATHY

Commitment means strong belief in something, a promise to do something, enthusiasm, duty/responsibility.

Empathy means the power of understanding and imaginatively entering into another person's feelings.

1.14 SPIRITUALITY

Indian ethos asserts that the spirit must lead matter. The awakening of the essential internal man assures all success. India always taught the people to put the spirit above matter to make internal excellence lead the quest for external excellence. The 'left brain' activities of reason, accumulation of wealth and dynamism must be guided by the 'right brain' activities of sacrifice, love and holistic actions. India never lost her grip over spiritual culture. 'Perhaps in return for conquest, arrogance and exploitation, India will teach us the tolerance and gentleness of mature mind, and quiet content of the inquisitive soul, the calm of the understanding spirit, and a unifying love for all beings'.

1.15 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:

1. A self-assured standing,
2. Willing to listen to learn from others and adopt (flexibility),
3. Frank to speak the truth, and
4. respect others' efforts and give due credit.

The factors that shape self-confidence in a person are:

1. Heredity (attitudes of parents) and family environment (elders),
2. Friendship (influence of friends/colleagues),
3. Influence of superiors/role models, and
4. Training in the organization (e.g., training by Technical Evangelists at Infosys Technologies).

The following methodologies are effective in developing self-confidence in a person:

1. Encouraging SWOT analysis. By evaluating their strength and weakness, they can anticipate and be prepared to face the results.
2. Training to evaluate risks and face them (self-acceptance).
3. Self-talk . It is conditioning the mind for preparing the self to act, without any doubt on his capabilities. This make one accepts himself while still striving for improvement.
4. Study and group discussion, on the history of leaders and innovators (e.g., Sam Walton of Wal-Mart, USA).

18.1 SOCIAL EXPECTATIONS

An occasion stimulates our behavior to others and weights our perceived psychological distances from them. The joint effect of occasion and distances is to dispose us to act in a particular way. But, of course, we may not really behave this way, as the outcome may be undesirable for one reason or another. Given an occasion for behavior, our expectations of their consequences discipline our behavioral dispositions.

We live within a structure of social expectations, of belief, awareness, and apprehension of how others will react to our behavior, respond to our acts, play their roles in this human theater. As we behave toward others, we not only perceive them as distances vis a vis ourselves but we also apprehend how our behavior will affect them and what we can expect in return. These expectations clearly modify our dispositions, but how this relation manifests itself, how it finally issues in social behavior requires a more detailed analysis of social behavior.

Model questions

1. Define empathy and honesty.
2. Briefly explain about morals, values and ethics.

11. a) Classify the relationship between ethical values and law?

b) Compare between caring and sharing. (10+4 = 14 marks)

Or

12. a) Exemplify a comprehensive review about integrity and respect for others.

b) Discuss about co-operation and commitment.

Activity 1

- Values and skill complement each other. Elaborate.“For success in any Human Endeavour both values and skills are required.” Explain.What do you mean by values? How do they differ from skills? How are values and skillsComplementary?Explain how production skills and human values are complementary. Give two examples.

Activity 2

- What do you mean by values or human values?What is value education? Why there is a need of value education?How does value education helps in fulfilling one's aspirations?
- What is the difference between prosperity and wealth? What is more acceptable to us and why?

MODULE 2

SENSES OF ENGINEERING ETHICS

- There are two different senses (meanings) of engineering ethics, Normative and the Descriptive senses.
- The normative sense include: (a) Knowing moral values, finding accurate solutions to moral problems and justifying moral judgments in engineering practices, (b) Study of decisions, policies, and values that are morally desirable in the engineering practice and research, and (c) Using codes of ethics and standards and applying them in their transactions by engineers.
- The descriptive sense refers to what specific individual or group of engineers believe and act, without justifying their beliefs or actions

VARIETY OF MORAL ISSUES

- why do people behave unethically?
- The reasons for people including the employer and employees, behaving unethically may be classified into three categories
- 1. Resource Crunch (situation occurs due to shortage of time/resources)
- 2. Opportunity
- 3. Attitude

TYPES OF INQUIRIES

- The three types of inquiries, in solving ethical problems are:

  - normative inquiry
  - conceptual inquiry
  - factual or descriptive inquiry.

Enquiry /Inquiry

NORMATIVE INQUIRY

- It seeks to identify and justify the morally-desirable norms or standards that should guide individuals and groups. Normative questions are about what ought to be and what is good, based on moral values. For example,

  - 1. How far does the obligation of engineers to protect public safety extend in any given situation?
  - 2. When, if ever, should engineers be expected to blow whistle on dangerous practices of their employers?

CONCEPTUAL INQUIRY

- It is directed to clarify the meaning of concepts or ideas or principles that are expressed by words or by questions and statements. For example,
  - (a) What is meant by safety?
  - (b) How is it related to risk?

FACTUAL OR DESCRIPTIVE INQUIRY

- It is aimed to obtain facts needed for understanding and resolving value issues. Researchers conduct factual inquiries using mathematical or statistical techniques
- For example,
  - 1. How were the benefits assessed?
  - 2. What are procedures followed in risk assessment?

MORAL DILEMMA

- 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.

STEPS TO SOLVE DILEMMA

1. Identification of the moral factors and reasons
2. Collection of all information, data, and facts (factual inquiry) relevant to the situation.
3. Rank the moral options i.e., priority in application through value system, and also as obligatory,all right, acceptable, not acceptable, damaging, and most damaging etc.
4. Generate alternate courses of action to resolve the dilemma.
5. Discuss with colleagues and obtain their perspectives, priorities, and suggestions on various alternatives.
6. Decide upon a final course of action, based on priority fixed or assumed

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’.
- Viewing engineering as social experimentation will promote autonomous participation and retain one’s professional identity.
- 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 are listed as follows:

1. Proficiency in recognizing moral problems in engineering and ability to distinguish as well as relate them to problems in law, economics, and religion,
2. Skill in comprehending, clarifying, and critically-assessing arguments on different aspects of moral issues,
3. Ability to form consistent and comprehensive view points based on facts,
4. Awareness of alternate responses to the issues and creative solutions for practical difficulties,
5. Sensitivity to genuine difficulties and subtleties, including willingness to undergo and tolerate some uncertainty while making decisions,
6. Using rational dialogue in resolving moral conflicts and developing tolerance of different perspectives among morally reasonable people, and
7. Maintaining moral integrity.

MORAL DEVELOPMENT THEORIES

Kohlberg Theory

- Kohlberg suggested there are three levels of moral development based on the type of reasoning and motivation of the individuals in response to moral questions

1. Pre-conventional level
2. Conventional level
3. Post-conventional level

- 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 boy, good girl).
- 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.

Gilligan's Theory

- Carol Gilligan found that Kohlberg's theory had a strong male bias.
- According to Gilligan's studies, men had a tendency to solve problems by applying abstract moral principles.
- Men were found to resolve moral dilemma by choosing the most important moral rule, overriding other rules. - **Ethics of rules and rights**
- In contrast,women gave importance to preserve personal relationships with all the people involved.- **Ethics of care**
- Gilligan revised the three levels of moral development of Kohlberg, as stages of growth towards ethics of caring.

- The pre-conventional level, which is same as that of Kohlberg's first one, right conduct, is viewed in a selfish manner solely as what is good for oneself.
- The second level called conventional level, the importance is on not hurting others, and willing to sacrifice one's own interest and help others. This is the characteristic feature of women.
- At the post-conventional level, a reasoned balance is found between caring about others and pursuing the self-interest. The balance one's own need and the needs of others, is aimed while maintaining relationship based on mutual caring.
- This is achieved by context-oriented reasoning, rather than by hierarchy of rules.

Kohlberg's Theory	*Carol Gilligan's Theory*
A. Basic Aspects	
1. Is based on the study on men. 2. Men give importance to moral rule. 3. Ethics of rules and rights.	1. Is based on the study on men and women 2. Women always want to keep up the personal relationships with all the persons involved in the situations. 3. Women give attention to circumstances leading to critical situations rather than rules: (context-oriented and ethics of care)
B Characteristic Features	
1. Justice 2. Factual 3. Right or wrong 4. Logic only 5. Logic and rule-based 6. Less of caring 7. Matter of fact (practical) 8. Present focus 9. Strict rules 10. Independence 11. Rigid 12. Taking a commanding role 13. Transactional approach	1. Reason 2. Emotional 3. Impact on relationships 4. Compassion too 5. Caring and concern 6. More of caring 7. Abstract 8. Future focus 9. Making exceptions 10. Dependence 11. Human-oriented 12. Shying away from decision-making 13. Transformational approach

CONSENSUS AND CONTROVERSY

In the study of moral autonomy, consensus and controversy are relevant factors to discuss on. Consensus means agreement and controversy means conflict or disagreement.

In exercising moral autonomy, one is not likely to obtain the same results as by others. This situation is likely to end in a controversy. In this case, good amount of tolerance among the individuals who are autonomous, reasonable and responsible is necessary. This does not mean forcing the engineers to reach unique moral solutions. Many reasonable solutions are possible to a given ethical problem. The ethics make the engineers realize the importance of tolerance among them, in case of disagreement while applying moral autonomy.

PROFESSION & PROFESSIONALISM

PROFESSION is defined as any occupation/job/vocation that requires advanced expertise (skills and knowledge), self-regulation, and concerted service to the public good. It brings a high status, socially and economically. The characteristics of a profession are:

1. *Advanced expetise*: Many profcssions require sophisticated skills (do-how) and theoretical knowledge (know-how and why). Formal education, training, continuing education, updating are needed.
2. *Self regulation*: Professional societies play important role in setting standards for admission to profession, drafting codes of ethics, enforcing standards of conduct, and representing the profession before the public and the government.
3. *Public good*: The occupation provides some important public good, by concerted efforts to maintain ethical standards. For example, a physician promotes health, a lawyer protects the legal rights, an engineer provides a product or a project for use by the public towards their health, welfare, and safety. Teaching is also claimed as a profession as it helps shaping and training the minds of the students, young as well as old.

PROFESSIONAL relates to a person or any work that a person does on profession, and which requires expertise (skills and knowledge), self-regulation and results in public good. The term professional means a 'person' as well as a 'status'.

PROFESSIONALISM: It is the status of a professional which implies certain attitudes or typical qualities that are expected of a professional. According to **Macintyre**, professionalism is defines as the ***services related to achieving the public good, in addition to the practices of the knowledge of moral ideals.***

The *criteria* for achieving and sustaining professional status or professionalism are:

1. *Advanced expertise*: The expertise includes sophisticated skills and theoretical knowledge in exercising judgment. This means a professional should analyse the problem in specific known area, in an objective manner.
2. *Self-regulation*: One should analyse the problem independent of self-interest and direct to a decision towards the best interest of the clients/customers. An autonomous judgment (unbiased and on merits only) is expected. In such situations, the codes of conduct of professional societies are followed as guidance.
3. *Public good*: One should not be a mere paid employee of an individual or a teaching college or manufacturing organization, to execute whatever the employer wants one to do. The job should be recognised by the public. The concerted efforts in the job should be towards promotion of the welfare, safety, and health of the public.

MODELS OF PROFESSIONAL ROLES

- Promotion of public good is the primary concern of the professional engineers.
- There are several role models to whom the engineers are attracted.

1. Savior

- The engineer as a savior, save the society from poverty, illiteracy, wastage, inefficiency, ill health, human (labor) dignity and lead it to prosperity, through technological development and social planning.
- For example, R.L. Stevenson

2. Guardian

- He guards the interests of the poor and general public.
- As one who is conversant with technology development, is given the authority befitting his expertise to determine what is best suited to the society.
- For example, Lawrence of Arabia (an engineer).

3. Bureaucratic Servant

- He serves the organization and the employers.
- The management of an enterprise fixes its goals and assigns the job of problem solving to the engineer, who accepts the challenge and shapes them into concrete achievements.
- For example, Jamshedji Tata.

4. Social Servant

- It is one who exhibits social responsibility.
- The engineer translates the interest and aspirations of the society into a reality, remembering that his true master is the society at large.
- For example, Sir M.Viswesvarayya.

5. Social Enabler and Catalyst

- One who changes the society through technology.
- The engineer must assist the management and the society to understand their needs and make informed decisions on the desirable technological development and minimize the negative effects of technology on people and their living environment.
- Thus, he shines as a social enabler and a catalyst for further growth.
- For example, Sri Sundarlal Bahuguna

6. Game Player

- He is neither a servant nor master.
- An engineer is an assertive player, not a passive player who may carry out his master’s voice.
- He plays a unique role successfully within the organization, enjoying the excitement of the profession and having the satisfaction of surging ahead in a competitive world.
- For example, Narayanamurthy, Infosys and Dr. Kasthurirangan, ISRO.

THEORIES ABOUT RIGHT ACTION (ETHICAL THEORIES)

- **Uses**

1. In understanding moral dilemma.
2. It provides helpful practical guidance in moral issues towards the solution.
3. Justifying professional obligations and decisions
4. In relating ordinary and professional morality

- **Criteria**
- must be clear and coherent
- must be internally consistent
- must depend, only upon facts
- must provide guidance compatible with our moral judgments

THEORIES ABOUT RIGHT ACTION (ETHICAL THEORIES)

- **Utilitarian Theory**
  - the standard of right conduct is maximization of good consequences.Good consequences mean either ‘utilities’ or the ‘balance of good over evil’.

- **Duty Ethics**
  - states, that actions are consequences of performance of one’s duties such as, ‘being honest’, ‘not cause suffering of others’, ‘being fair to others including the meek and week’, ‘being grateful’, ‘keeping promises’ etc. The stress is on the universal principle of respect for autonomy i.e., respect and rationality of persons

- **Rights Theory**
  - Rights are entitlement to act or to have another individual act in a certain way. Minimally, rights serve as a protective barrier, shielding individuals from unjustified infringement of their moral agency by others.
- **The Virtue Theory**
  - This emphasizes on the character rather than the rights or duties. The character is the pattern of virtues (morally-desirable features). The theory advocated by Aristotle, stressed on the tendency to act at proper balance between extremes of conduct, emotion, desire, attitudes to find the golden mean between the extremes of ‘excess’ or ‘deficiency’

- **Self-realisation Ethics**
  - Right action consists in seeking self-fulfillment. In one version of this theory, the self to be realized is defined by caring relationships with other individuals and society. In another version called ethical egoism, the right action consists in always promoting what is good for oneself. No caring and society relationships are assumed.
- **Justice (Fairness) Theory**
  - The justice or fairness approach to ethics has its roots in the teachings of the ancient Greek philosopher Aristotle, who said that "equals should be treated equally and unequals unequally." The basic moral question in this approach is: How fair is an action? Does it treat everyone in the same way, or does it show favoritism and discrimination?

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.

CUSTOMS

- Various cultures in our pluralistic society lead to tolerance for various customs, beliefs, and outlooks.

RELIGION

- The religions insist on tolerance and moral concern for others. Many professionals who possess religious beliefs are motivated to be morally responsible.

CASE STUDY: CHOICE OF THE THEORY

- In tackling ethical problems, we can apply all the theories and analyze the actions and results from different angles and see what result each theory gives rise to. This enables us to examine the problem in different perspectives. Many a time, the result will be the same though we have applied various theories

Case: A chemical plant near a small town is discharging hazardous wastes into the fields nearby. The ground water gets contaminated and significant health problems surface in the community.

Since harm is caused to the residents, the action is unethical as per rights ethics. The agriculturists who have the agrarian right of water supply have been over looked. The pollutants may endanger their profession and welfare. Hence, *rights* ethics also concludes that the action is unethical.

The effects of polluted water and the cost to purify the water by the municipality may out weigh the economic benefits of the plant. Hence, the *utilitarian* analysis leads to the same conclusion.

The groundwater harms the people and caused health problems. Hence, discharging the pollutants is unethical as per *duty* ethics.

Generally, because the rights of the individuals should weigh strongly than the needs of the society as a whole, rights and duty ethics take precedence over utilitarian considerations.

Caution is necessary in applying theory of virtue ethics. When we use the word 'honor', we mean it to be a measure of dignity and integrity. It is a positive virtue. When it points to 'pride' it is not a virtue and has a negative connotation. History abounds with examples of war, which have been fought and atrocities were committed on innocent people in order to preserve the honor (pride) of an individual or a nation. In using virtue ethics, we have to ensure that the traits of virtue are actually virtuous and will not lead to negative consequences.

- Senses of Engineering Ethics - Variety of moral issues- Types of inquiry- Moral dilemmas – Moral Autonomy – Kohlberg's theory- Gilligan's theory- Consensus and Controversy- Profession and Professionalism- Models of professional roles-Theories about right action –Self interest-Customs and Religion- Uses of Ethical Theories.

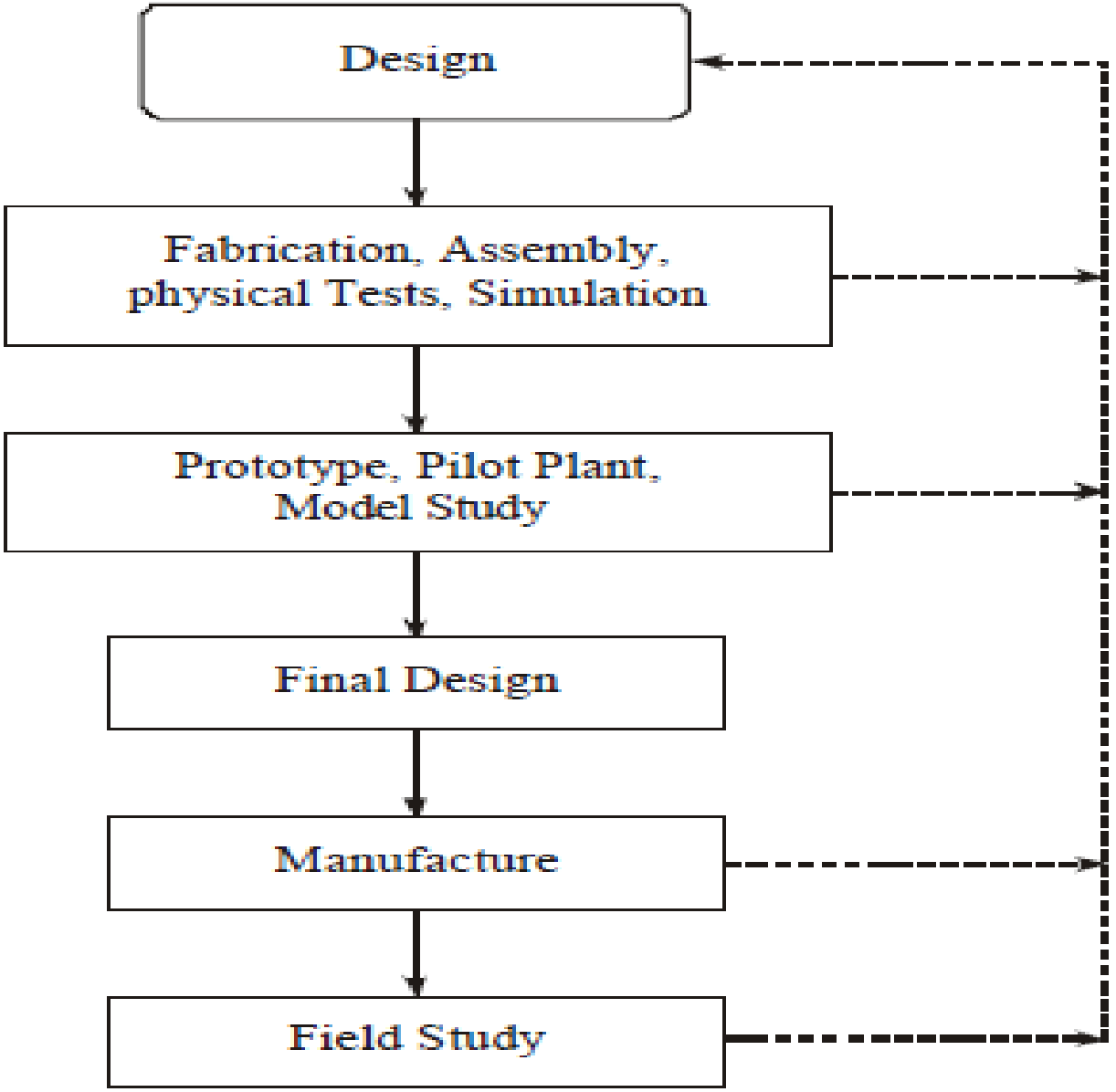
MODULE 3

ENGINEERING AS EXPERIMENTATION

- Design as well as engineering is iterative process
- Before manufacturing a product or providing a project,
  - ➢ we make several assumptions and trials,
  - ➢ Design and redesign
  - ➢ Test several times till the product is observed to be functioning satisfactorily.
  - ➢ We try different materials and experiments.
  - ➢ From the test data obtained we make detailed design and retests.

- Several redesigns are made upon the feedback information on the performance or failure in the field or in the factory.
- Besides the tests, each engineering project is modified during execution, based on the periodical feedback on the progress and the lessons from other sources.

- Hence, the development of a product or a project as a whole may be considered as an experiment.


Design
Fabrication, Assembly, physical Tests, Simulation
Prototype, Pilot Plant, Model Study
Final Design
Manufacture
Field Study

Engineering Projects VS. Standard Experiments

Similarities

- Partial ignorance
- Uncertainty
- Continuous monitoring
- Learning from the past

Contrasts

- Humane touch
- Informed consent
- Knowledge gained
- Experimental control

- **Experimental control**: In standard experiments, members for study are selected into two groups namely A and B at random. Group A are given special treatment. The group B is given no treatment and is called the 'controlled group'. But they are placed in the same environment as the other group A. This process is called the experimental control.

- Informed consent has two basic elements:

1. Knowledge: The subject should be given all relevant information needed to make the decision to participate.
2. Voluntariness: Subject should take part without force, fraud or deception. Respect for rights of minorities to dissent and compensation for harmful effect are assumed here.

ENGINEERS AS RESPONSIBLE EXPERIMENTERS

- The engineers facilitate experiments and their responsibility is shared with the organizations, people, government, and others.
- The engineers share a greater responsibility while monitoring the projects, identifying the risks, and informing the clients and the public with facts.
- The engineer, as an experimenter, owe several responsibilities to the society, namely,
- 1. A conscientious commitment to live by moral values.
- 2. A comprehensive perspective on relevant information. It includes constant awareness of the progress of the experiment and readiness to monitor the side effects, if any.
- 3. Unrestricted free-personal involvement in all steps of the project/product development.
- 4. Be accountable for the results of the project.

Conscientiousness

- Conscientious moral commitment means:

(a) Being sensitive to full range of moral values and responsibilities relevant to the prevailing situation

(b) The willingness to develop the skill and put efforts needed to reach the best balance possible among those considerations.

- In short, engineers must possess open eyes, open ears, and an open mind (i.e., moral vision, moral listening, and moral reasoning).
- This makes the engineers as social experimenters, respect foremost the safety and health of the affected, while they seek to enrich their knowledge, rush for the profit, follow the rules, or care for only the beneficiary.
- The human rights of the participant should be protected through voluntary and informed consent.

Comprehensive Perspective

- The engineer should grasp the context of his work and ensure that the work involved results in only moral ends.
- One should not ignore his conscience, if the product or project that he is involved will result in damaging the nervous system of the people (or even the enemy, in case of weapon development)
- A product has a built-in obsolete or redundant component to boost sales with a false claim.
- In possessing of the perspective of factual information, the engineer should exhibit a moral concern and not agree for this design.
- Finally, a full-scale environmental or social impact study of the product or project by individual engineers is useful but not possible, in practice.

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’.
- Viewing engineering as social experimentation will promote autonomous participation and retain one’s professional identity.
- 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 are listed as follows:

1. Proficiency in recognizing moral problems in engineering and ability to distinguish as well as relate them to problems in law, economics, and religion,
2. Skill in comprehending, clarifying, and critically-assessing arguments on different aspects of moral issues,
3. Ability to form consistent and comprehensive view points based on facts,
4. Awareness of alternate responses to the issues and creative solutions for practical difficulties,
5. Sensitivity to genuine difficulties and subtleties, including willingness to undergo and tolerate some uncertainty while making decisions,
6. Using rational dialogue in resolving moral conflicts and developing tolerance of different perspectives among morally reasonable people, and
7. Maintaining moral integrity.

Accountability

- The term Accountability means:

1. The capacity to understand and act on moral reasons
2. Willingness to submit one's actions to moral scrutiny and be responsive to the assessment of others.

- The tug-of-war between of causal influence by the employer and moral responsibility of the employee is quite common in professions.
- In the engineering practice, the problems are:

a) The fragmentation of work in a project inevitably makes the final products lie away from the immediate work place, and lessens the personal responsibility of the employee.

b) Further the responsibilities diffuse into various hierarchies and to various people. Nobody gets the real feel of personal responsibility.

c) Often projects are executed one after another. An employee is more interested in adherence of tight schedules rather than giving personal care for the current project.

d) More litigation is to be faced by the engineers (as in the case of medical practitioners).This makes them wary of showing moral concerns beyond what is prescribed by the institutions.

- In spite of all these shortcomings, engineers are expected to face the risk and show up personal responsibility as the profession demands.

CODES OF ETHICS

- The ‘codes of ethics’ exhibit, rights, duties, and obligations of the members of a profession and a professional society.
- The codes exhibit the following essential roles:

1. Inspiration and guidance. The codes express the collective commitment of the profession to ethical conduct and public good and thus inspire the individuals.
2. Support to engineers. The codes give positive support to professionals for taking stands on moral issues.
3. Deterrence (discourage to act immorally) and discipline (regulate to act morally). The codes serve as the basis for investigating unethical actions.
4. Education and mutual understanding. Codes are used to prompt discussion and reflection on moral issues. They develop a shared understanding by the professionals, public, and the government on the moral responsibilities of the engineers.

5. Create good public image. The codes present positive image of the committed profession to the public, help the engineers to serve the public effectively.
6. Protect the status quo. They create minimum level of ethical conduct and promotes agreement within the profession. Primary obligation namely the safety, health, and welfare of the public, declared by the codes serves and protects the public.
7. Promotes business interests. The codes offer inspiration to the entrepreneurs, establish shared standards, healthy competition, and maximize profit to investors, employees, and consumers.

- **Limitations: The codes are not remedy for all evils. They have many limitations, namely:**

1. General and vague wordings. Many statements are general in nature and hence unable to solve all problems.
2. Not applicable to all situations. Codes are not sacred, and need not be accepted without criticism. Tolerance for criticisms of the codes themselves should be allowed.
3. Often have internal conflicts. Many times, the priorities are clearly spelt out
4. They can not be treated as final moral authority for professional conduct. Codes have flaws by commission and omission.
5. Only a few enroll as members in professional society and non-members can not be compelled.
6. Even as members of the professional society, many are unaware of the codes
7. Different societies have different codes. The codes can not be uniform or same!.
8. Codes are said to be coercive. They are sometimes claimed to be threatening and forceful.

PLAGIARISM

- The copyright is a specific and exclusive right, describing rights given to creators for their literary and artistic works.
- The life of the copyright protection is the life of the inventor or author plus 50 years.
- Copyright is effective in

(a) Preventing others from copying or reproducing or storing the work

(b) Publishing and selling the copies

(c) Performing the work in public, commercially

(d) To make film

(e) To make translation of the work

(f) To make any adaptation of the work.

- Copying the idea is called ‘plagiarism’ and it is dealt with separately.

- Plagiarism is the act of presenting the words, ideas, images, sounds, or the creative expression of others as your own.

Two types of plagiarism:

Intentional

- Copying a friend's work
- Buying or borrowing papers
- Cutting and pasting blocks of text from electronic sources without documenting
- Media "borrowing" (ex: using a google image) without documentation
- Web publishing without permissions of creators

Unintentional

- Careless paraphrasing
- Poor documentation
- Quoting excessively
- Failure to use your own "voice"
- Taking work you've created elsewhere and turning it in again without changes

A BALANCED OUTLOOK ON LAW

- The 'balanced outlook on law' in engineering practice stresses the necessity of laws and regulations and also their limitations in directing and controlling the engineering practice
- Laws are needed to provide a minimum level of compliance.
- The following codes are typical examples of how they were enforced in the past.

3.4.1 Code for Builders by Hammurabi

- Hummurabi the king of Babylon in 1758 framed the following code for the builders:
- "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 caused the death of the householder, that builder shall be put to death. If
- it causes the death of the householder's son, they shall put that builder's son to death. If it causes the
- death of the householder's slave, he shall give slave for slave to the householder. If it destroys property,
- he shall replace anything it has destroyed; and because he has not made the house sound which he has built and it has fallen down, he shall rebuild the house which has fallen down from his own property.
- If a builder has built a house for a man and does not make his work perfect and the wall bulges, that
- builder shall put that wall in sound condition at his own cost"
- This code was expected to put in self-regulation seriously in those years.

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3.4.2 Steam Boat Code in USA

•Whenever there is crisis we claim that there ought to be law to control this.

• Whenever there is a fire accident in a factory or fire cracker's store house or boat capsize we make this claim, and soon forget.

•Laws are meant to be interpreted for minimal compliance. On the other hand, laws when amended or updated continuously, would be counter productive.

•Laws will always lag behind the technological development. The regulatory or inspection agencies such as Environmental authority of India can play a major role by framing rules and enforcing compliance.

•In the early 19th century, a law was passed in USA to provide for inspection of the safety of boilers and engines in ships.It was amended many times and now the standards formulated by the American Society of Mechanical Engineers are followed.

3.4.3 Proper Role of Laws

- Good laws when enforced effectively produce benefits. They establish minimal standards of professional conduct and provide a motivation to people.
- Further they serve as moral support and defense for the people who are willing to act ethically.Thus, it is concluded that:

1. The rules which govern engineering practice should be construed as of responsible experimentation rather than rules of a game. This makes the engineer responsible for the safe conduct of the experiment.
2. Precise rules and sanctions are suitable in case of ethical misconduct that involves the violation of established engineering procedures, which are aimed at the safety and the welfare of the public.
3. In situations where the experimentation is large and time consuming, the rules must not try to cover all possible outcomes, and they should not compel the engineers to follow rigid courses of action.
4. The regulation should be broad, but make engineers accountable for their decisions, and
5. Through their professional societies, the engineers can facilitate framing the rules, amend wherever necessary, and enforce them, but without giving-in for conflicts of interest

Challenges case study- **Bhopal gas tragedy**.

- The Bhopal gas tragedy (commonly referred to as Bhopal disaster) was a gas leak incident in India, considered one of the worlds worst industrial catastrophes.
- It occurred on the night of 2nd–3rd December 1984 at the Union Carbide India Limited (UCIL) pesticide plant in Bhopal, Madhya Pradesh.
- A leak of methyl isocyanate (MIC) gas and other chemicals from the plant resulted in the exposure of hundreds of thousands of people.
- The UCIL factory was built to produce the pesticide Sevin (UCCs brand name for carbaryl) using methyl isocyanate (MIC) as an intermediate.
- Methylamine reacts with phosgene producing methyl isocyanate which reacts with 1- naphthol to yield carbaryl .

  Methylamine + Phosgene = Methyl isocyanate

  Methyl isocyanate + 1- naphthol = Carbaryl

- During the night of 2–3 December 1984, water entered Tank E610 containing 42 tons of MIC.The resulting exothermic reaction increased the temperature inside the tank to over 200°C (392 °F) and raised the pressure.About 30 metric tons of methyl isocyanate (MIC) escaped from the tank into the atmosphere of Bhopal in 45 to 60 minutes.
- **EFFECTS** – Eyes,Respiratory system,Lung injury,Immune system,Neurological system,Psychological effects,Women's reproductive health,Genetics etc.
- **EFFECTS ON SURROUNDINGS** - The ground water around the plant is polluted, Contamination of soil,Contaminants found in breast milk,Lose of consciousness while entering the area for more than ten minutes,Genetic disorders.

•**FACTORS LEADING TO THE GAS LEAK** - Storing MIC in large tanks and filling beyond recommended levels,Poor maintenance,Failure of several safety systems,Safety systems being switched off to save money—including the MIC tank refrigeration system which could have mitigated the disaster severity,Plant location close to a densely populated area,Undersized safety devices,The dependence on manual operations.

• **Conclusion** :The disaster did pave the way for much stricter international standards for environmental safety, preventative strategies to avoid similar accidents. Better understanding of the fact that industries need to apply good process safety management systems and have efficient and safe handling and storage capacities of individual reactive chemicals. Environmental awareness and activism in India has increased tremendously.

Module 3- Engineering as social Experimentation.

- Engineering as Experimentation
- Engineers as responsible Experimenters
- Codes of Ethics
- Plagiarism
- A balanced outlook on law
- Challenges case study- Bhopal gas tragedy.

MODULE 4

Responsibilities and Rights.

- Collegiality and loyalty – Managing conflict- Respect for authority- Collective bargaining- Confidentiality- Role of confidentiality in moral integrity-Conflicts of interest- Occupational crime- Professional rights Employee right- IPR Discrimination.

COLLEGIALITY AND LOYALTY:

Collegiality is the tendency to support and cooperate with the colleagues. It is a virtue essential for the team work to be effective. This consists of various aspects such as:

1. *Respect to the ideas and work of others*: This results in support and co-operation with one's colleagues. One gets back the support and cooperation in return, and this is mutually beneficial.
2. *Commitment to moral principles*: Commitment is towards moral decisions, actions, goals of the organisation and values of the profession.
3. *Connectedness*: It means the shared commitment and mutual understanding. It ensures the absence of egoism and paves way for progress for both.

LOYALTY

- It is the quality of being true and faithful in one's support.
- It is more a function of attitudes, emotions and a sense of identity.
- It is more a function of attitudes, emotions and a sense of identity.

Loyalty is exhibited in two senses, namely,

1. Agency Loyalty

It is an obligation to fulfill his/her contractual duties to the employer. The duties are specific actions one is assigned, and in general cooperating with others in the organization. It consists of several obligations to employers. But, for the engineers, the paramount obligation is still "the safety, health, and welfare of the public"

2. Attitude Loyalty (or Identification loyalty)

It is concerned with the attitudes, emotions, and a sense of personal identity. It includes willingness to meet moral duties, with attachment, conviction, and trust with employer. The attitude loyalty is more a virtue than an obligation. This type of loyalty is all right when the organizations work for productivity or development of community. Working together in falsification of records or serious harm to the public, does not merit loyalty. Further, with frequent takeovers or merger resulting in large-scale lay-off, employees find it difficult to maintain attitude-loyalty.

Managing Conflicts

- The conflict situations should be tolerated, understood, and resolved by participation by all the concerned.
- The conflicts in case of project managers arise in the following manners:

(a) Conflicts based on schedules: This happens because of various levels of execution, priority and limitations of each level.

(b) Conflicts arising out of fixing the priority to different projects or departments. This is to be arrived at from the end requirements and it may change from time to time.

(c) Conflict based on the availability of personnel.

(d) Conflict over technical, economic, and time factors such as cost, time, and performance level.

(e) Conflict arising in administration such as authority, responsibility, accountability, and logistics required.

(f) Conflicts of personality, human psychology and ego problems.

(g) Conflict over expenditure and its deviations.

- Most of the conflicts can be resolved by following the principles listed here

1. People

- Separate people from the problem. It implies that the views of all concerned should be obtained

2. Interests

- Focus must be only on interest i.e., the ethical attitudes or motives and not on the positions.
- Mutual interests must be respected to a maximum level. What is right is more important than who is right!

3. Options

- Generate various options as solutions to the problem. This helps a manager to try the next best solution should the first one fails. Decision on alternate solutions can be taken more easily and without loss of time.

4. Evaluation

- The evaluation of the results should be based on some specified objectives such as efficiency, quality, and customer satisfaction.

Respect for authority

- In order to meet the organizational goals, the professionals should possess respect for authority.
- The levels of authority maintained by the organization provides a means for identifying areas of personal responsibility and accountability.
- Following are the major types of authority

✓ **Institutional Authority / Executive Authority –** The corporate or institutional right given to a person to exercise power based on the resources of an organization.

✓ **Expert Authority –** This is the possession of special knowledge, skill or competence to perform a particular task or to give sound advice.

- According to the goals of the company, the hierarchical authority is distributed.
- A service oriented or engineer-oriented company concentrates on the quality of the products which are decided by the engineers as they are the subject matter experts. Whereas a company when it is customer-oriented company, focuses primarily on the satisfaction of the customers.Hence the goal of the company decides the power between a General Manager and a Technical Manager or an Engineer.

COLLECTIVE BARGAINING

- It is the responsibility of an organization to look into the welfare of the section of people working in it. Their issues need to be discussed.
- In order to deal with such complex situations, an Employee Union is formed wherein, each employee becomes a member and a leader is elected to represent the group whenever needed. At the time of conflicts or arguments, there will arise the need for negotiation between the parties.
- The process of voluntary negotiations between the employers and a group of employees to resolve the conflicts is called **Collective Bargaining**.
- The process includes negotiation, threatening verbally, and declaration of ‘strike’.
- It is impossible to endorse fully the collective bargaining of unions or to condemn.

Types of Collective Bargaining

- There are four main types of collective bargaining –
- **Distributive Bargaining** – In this, one party's gain is another party's loss. **Example** – Wages
- **Integrative bargaining** – In this, both the parties may gain or none of the parties may face a loss. **Example** – Better training programs
- **Attitudinal Structuring** – When there is backlog of bitterness between both the parties then attitudinal structuring is required to make smooth industrial relations.
- **Intra-organizational Bargaining** – There can be conflicting groups in both management and unions also. So, there is need to achieve consensus in these groups.

CONFIDENTIALITY

- Confidentiality means keeping the information on the employer and clients, as secrets.
- It is one of the important aspects of team work

Justification for Confidentiality

- Confidentiality can be justified by various *ethical theories.*
- *According to Rights-based theory, rights of* the stakeholders, right to the intellectual property of the company are protected by this practice.
- Based on Duty theory, employees and employers have duty to keep up mutual trust.
- The Utilitarian theory holds good, only when confidentiality produce most good to most people. Act utilitarian theory focuses on each situation, when the employer decides on some matters as confidential

- The following moral principles also justify the concept of confidentiality.

➢ *Respect for Autonomy*

- It means respecting the freedom and self-determination of individuals and organizations to identify their legitimate control over the personal information of themselves

➢ *Respect for Promises*

This means giving respect for the promises made between the employers and employees.

➢ *Trustworthiness*

Maintaining confidentiality by lawyers, accountants, and attorneys are necessary to develop confidence and welfare of the individuals and the organizations. It does not mean however that these professionals collude with them unethically.

➢ *Respect for Public welfare*

This moral consideration is important in identifying relationships in professional transactions, for the benefit of public welfare, e.g., if the medical practitioners keep confidentiality on the problems of patients, patients develop confidence and trust in them, they feel free to reveal their problems and personal information, without being shy. This is likely to increase their chances of being cured. Similarly,

CONFLICT OF INTEREST

A conflict of interest occurs when the employee has more than one interest. A professional conflict of interest is the situation where the professional has an interest that, if pursued, might prevent him from meeting his obligations to his employers or clients, e.g., an Electrical Engineer working in the State Electricity Board may have a financial interest in a company which supplies electrical instruments. If the engineer is decide on the bid for the supply of electrical instruments, a clear case of conflict of interest exists.

A 'conflict of interest' is different from 'conflicting interests'. A student has to clear four arrears subjects in the supplementary examination. But he finds that the time available is sufficient to study only three subjects. This is a situation of 'conflicting interests', where he has two or more desires that can not be fulfilled under the given circumstances. But there is no moral problem involved in pursuing all subjects. In case of professional conflict of interest, there is a possibility of pursuing all the conflicting interests, thereby inviting a moral problem.

TYPES OF CONFLICTS OF INTEREST

Several types of conflicts of interests exist depending on the ways and severity of outside interests. A few common types are discussed here.

1. Actual Conflict of Interest

This refers to the situation where the objectivity is lost in decision making, and the inability to discharge the duty to the employer. It is the result of weaker judgment and service. A Civil Engineer working in the Public Works Department has a financial interest in a contracting company, which has submitted a bid for the construction of a bridge. There may be a variety of outside interests. But the conflict arises when the outside interest influences or threatens the professional judgment in serving the employer or clients.

2. Apparent Conflict of Interest

This is explained in the following example. An engineer is paid based on a per cent of the cost of the design and there is no incentive for him to cut the costs. In this situation, it appears that the engineer makes the design more expensive in order to get larger commission for him. This situation leads to doubting the engineer's interest and ability for professional judgment.

3. *Potential Conflict of Interest*

There are situations where the interest of an employee extends beyond the current employer and into the interest on one's spouse, relative or friend. The interest changes into intimacy and subsequent non-moral judgments against the interest of the employer and in favor of the outsider or even a potential competitor.

(*a*) Favorable Contact

When an engineer's spouse is working for a contractor or vendor, a conflict does not arise. But if the engineer is to give a subcontract to the contractor or purchase order to the supplier, the conflict arises. This happens even when the engineer has partial or substantial stockholding in the business of that contractor or supplier.

(*b) Bribe and Gift*

The conflict arises when accepting large gifts from the suppliers. Bribe is different from a gift.

(*c) Moonlighting*

- It is a situation when a person is working as employee for two different companies in the spare time. This is against the right to pursue one's legitimate self-interest. It will lead to conflict of interests, if the person works for competitors, suppliers or customers, while working under an employer. Another effect of moonlighting is that it leaves the person exhausted and harms the job performance in both places.

(*d) Insider Information*

Another potential conflict of interest is when using 'inside' information to establish a business venture or get an advantage for oneself or one's family or friends. The information may be either of the parent company or its clients or its business partners, e.g., engineers might inform the decision on the company's merger with another company or acquisition or an innovative strategy adopted. In such cases, their friends get information on stock holding and decide on trading their stocks to sell or buy quickly, so that gain more or prevent a loss.

Occupational Crime

- Occupational crimes are illegal acts made possible through one's lawful employment.
- It is the secretive violation of laws regulating work activities.
- When committed by office workers or professionals, occupational crime is called 'white collar crime'.
- These crimes are motivated by personal greed, corporate ambition, misguided company loyalty etc.
- These crimes impinge on various aspects such as professionalism, loyalty, conflicts of interest and confidentiality.
- Examples of occupational crimes:

1. Price Fixing
2. Endangering Lives
3. Industrial espionage(spying)

Price Fixing

- While fixing price for a product/service, sometimes all competitors come together and jointly set the prices to be charged. These are called as “Pricing Cartels”. In order to avoid these crimes laws are enforced which forbids companies from jointly fixing prices.

Endangering Lives

- Workers are employed without disclosing the effects of the harmful health effects and safety hazards. Due to this, workers are exposed to serious health problems.

Industrial Espionage: Espionage means Spying.

- It refers to secret gathering of information in order to influence relationships between two entities.
- Acquisition of other’s secret to one’s advantage is Espionage. The vital information are secretly gathered/theft through espionage agents called spies.
- The information may be intellectual properties such as designs, prototypes, formulae, software codes, passwords, manufacturing process, marketing plans, supplier/contractor details etc

Human rights

- Human rights are defined as moral entitlements that place obligations on other people to treat one with dignity and respect.
- Organisations and engineers are to be familiar with the minimum provisions under the human rights, so that the engineers and organizations for a firm base for understanding and productivity.
- Provisions under ‘human rights’ are as follows:

1. Right to pursue legitimate personal interest
2. Right to make a living
3. Right to privacy
4. Right to property
5. Right of non-discrimination
6. No sexual harassment

Professional Rights

- Under professional rights, the following provisions are protected:

1. Right to form and express professional judgment
2. Right to refuse to participate in unethical activities
3. Right to fair recognition and to receive remuneration for professional services
4. Right to Due Process from Employer
5. Right to Equal Opportunity—Non-discrimination
6. Right to Equal Opportunity—Sexual Harassment in the Workplace
7. Right to Equal Opportunity—Affirmative Action or Preferential Treatment

EMPLOYEE RIGHTS

Employee rights are the moral and legal rights that are obtained by the status of being an employee. The provisions made to the employees under this category are:

1. Professional rights (discussed already)
2. Basic human rights (discussed already)
3. Institutional rights or contractual employee rights. This include the rights to the institution due to the organisational policies or contracts, right to receive specified salary and annual increments, and profit sharing. The quantum of such benefits, scale of pay etc. are fixed and reviewed periodically by the employers and employees.
4. Non-contractual employee rights: These are the rights provided in common, besides the contractual ones. They include:

1. *Right to Privacy*

It is the right to control the access to and use of information about oneself. This right is limited in certain situations by employers' rights. But who among the employers can access the personal information is again restricted. Only duly authorized persons can get the personal information.

For example,

(*a*) The Pay Bill Section can access the information on insurance premium paid, medical reimbursement etc. but one's immediate boss need not get this data.

(*b*) Persons who have applied for the jobs of cashier are required to report if there are any criminal or civil cases pending against them. Those persons may mishandle the money. Hence, that information may be sought from them.

2. *Right to Choose Outside Activities*

This is also interpreted as a right to personal privacy as that means a right to have a private life outside the job. There are some situations when this right can be curbed. For example,

1. When those activities lead to violation or found detrimental to the duties of their job.
2. When the activities of the employees form a conflict or interest (e.g., when moonlighting).
3. When the interest of the employer is getting damaged (if the employee transfers some vital information on plans or strategies to the competitor).

3. *Right to Due Process from Employer*

It is the right to fair process or procedures in firing, demotion and in taking any disciplinary actions against the employees. Written explanation should be initially obtained from the charged employee and the orders are given in writing, with clearly-stated reasons. Simple appeal procedures should be framed and made available to all those affected. Fairness here is specified in terms of the process rather than the outcomes.

4. *Right to Equal Opportunity—Non-discrimination*

Discrimination because of caste, sex, religion, creed, and language are regressive actions. Discrimination which means a morally unjust treatment of people in the workplace is damaging to the human dignity. For example,

(*a*) A senior manager post is vacant. There is competent and proven candidate from outside the state. A local engineer with lesser competence is promoted.

(*b*) Prize amounts for the winners in the world sport events are not the same for men and women.

5. *Right to Equal Opportunity—Sexual Harassment in the Workplace*

The sexual harassment is a display of arrogance and misuse of power through sexual means. It is against the moral autonomy i.e., freedom to decide on one's own body. It is also an assault on one's human dignity and trust.

Intellectual property rights (IPRs)

- Intellectual property rights (IPRs) are the protections granted to the creators of IP, and include trademarks, copyright, patents, industrial design rights, and in some jurisdictions trade secrets.
- IP permits people to have fully independent ownership for their innovation and creativity, like that of own physical property.
- This encourages the IP owners towards innovation and benefit to the society.
- It is an asset that can be bought or sold, licensed, and exchanged. It is intangible i.e., it cannot be identified by specific parameters.
- The agreements with World Trade Organization (WTO) and Trade-Related aspects of Intellectual Property System (TRIPS) have been adopted effective from January 2005.
- The global IPR system strengthens protection, increases the incentives for innovation, and raises returns on international technology transfer.

Types and Norms 1. Patents

- Patent is a contract between the individual (inventor) and the society (all others).
- Patents protect legally the specific products from being manufactured or sold by others, without permission of the patent holder.
- Patent holder has the legally-protected monopoly power as one's own property.
- The validity is 20 years from the date filing the application for the patent.
- It is a territorial right and needs registration. The Patent (Amendment) Act 2002 guarantees such provisions

Types and Norms 2. Copyright

- The copyright is a specific and exclusive right, describing rights given to creators for their literary and artistic works.
- This protects literary material, aesthetic material, music, film, sound recording, broadcasting, software, multimedia, paintings, sculptures, and drawings including maps, diagrams, engravings or photographs.
- There is no need for registration and no need to seek lawyer's help for settlement.
- The life of the copyright protection is the life of the inventor or author plus 50 years.
- Copyright gives protection to particular expression and not for the idea. Copying the idea is called 'plagiarism' and it is dealt with separately.
- Copyright is effective in
- (a) preventing others from copying or reproducing or storing the work,
- (b) publishing and selling the copies,
- (c) performing the work in public, commercially
- (d) to make film
- (e) to make translation of the work
- (f) to make any adaptation of the work.

Types and Norms 3. Trademark

- Trademark is a wide identity of specific good and services, permitting differences to be made among different trades.
- It is a territorial right, which needs registration.
- Registration is valid initially for 10 years, and renewable.
- The trademark or service mark may be registered in the form of a device, a heading, a label, a ticket, a letter, a word or words, a numeral or any combination of these, logos, designs, sounds, and symbols.
- Trademark should not be mistaken for a design, e.g., the shape of a bottle in which a product is marketed, can not be registered as a trademark.
- Trademarks Act 1999 made in compliance with TRIPS agreement, provides further details.

- There are three functions of trademark:
- 1. Just as we are identified by our names, good are identified by their trademarks. For example, the customer goes to the shop and asks for Lux soap. The word ‘Lux’ is a trade mark. In other words it shows the origin or source of the goods.
- 2. The trademark carries with it an inherent indication or impression on the quality of goods, which indirectly demonstrates that it receives the customer’s satisfaction.
- 3. The trademark serves as silent sales promoter. Without a trademark, there can be no advertisement.

Types and Norms 4. Trade secret

- A trade secret is the information which is kept confidential as a secret.
- This information is not accessed by any other than the owner.
- This gives a commercial advantage over the competitors.
- The trade secrets are not registered but only kept confidential.
- These are given limited legal protection against abuse by the employee or contractor by keeping confidentiality and trust.
- A trade secret can be a formula, practice, process, design, instrument, pattern, commercial method, or compilation of information not generally known or reasonably ascertainable by others by which a business can obtain an economic advantage over competitors or customers.

MODULE 5

Module 5- Global Ethical Issues.

- Multinational Corporations- Environmental Ethics- Business Ethics- Computer Ethics -Role in Technological Development-Engineers as Managers- Consulting Engineers- Engineers as Expert witnesses and advisors-Moral leadership.

GLOBALIZATION

- Globalization means integration of countries through commerce, transfer of technology, and exchange of information and culture.
- In a way, it includes acting together and interacting economies through trade, investment, loan, development schemes and capital across countries.
- In a different sense, these flows include knowledge, science, technology, skills, culture, information, and entertainment, besides direct human resource, tele-work, and outsourcing.
- This interdependence has increased the complex tensions and ruptures among the nations.

Multinational Corporations

- Organizations who have established business in more than one country, are called multinational corporation.
- The headquarters are in the home country and the business is extended in many host countries.
- The Western organizations doing business in the less-economically developed countries gain the advantage of inexpensive labor, availability of natural resources, conducive-tax atmosphere, and virgin market for the products.
- At the same time, the developing countries are also benefited by fresh job opportunities, jobs with higher remuneration and challenges, transfer of technology, and several social benefits by the wealth developed. But this happens invariably with some social and cultural disturbance.
- Loss of jobs for the home country, and loss or exploitation of natural resources, political instability for the host countries are some of the threats of globalization.

ENVIRONMENTAL ETHICS

- Environmental ethics is the study of (a) moral issues concerning the environment, and (b) moral perspectives, beliefs, or attitudes concerning those issues.
- Engineers now design eco-friendly tools, machines, sustainable products, processes, and projects.
- These are essential now to

(a) ensure protection (safety) of environment

(b) prevent the degradation of environment, and

(c) slow down the exploitation of the natural resources so that the future generation can survive.

- Engineers as experimenters have certain duties towards environmental ethics, namely:

1. Environmental impact assessment: One major but sure and unintended effect of technology is wastage and the resulting pollution of land, water, air and even space. Study how the industry and technology affects the environment.
2. Establish standards: Study and to fix the tolerable and actual pollution levels.
3. Counter measures: Study what the protective or eliminating measures are available for immediate implementation
4. Environmental awareness: Study on how to educate the people on environmental practices, issues, and possible remedies.

Computer Ethics

- Computer ethics is defined as (a) study and analysis of nature and social impact of computer technology,(b) formulation and justification of policies, for ethical use of computers.
- The use of computers have raised a host of moral concerns such as free speech, privacy, intellectual property right, and physical as well as mental harm.
- **Types of Issues**

1. Computer as the Instrument of Unethical Acts

(a) The usage of computer replaces the job positions This has been overcome to a large extent by readjusting work assignments, and training everyone on computer applications

(b) Breaking privacy. Information or data of the individuals accessed or erased or the ownership changed.

(c) Defraud a bank or a client, by accessing and withdrawing money from other's bank account.

2. Computer as the Object of Unethical Act

- The data are accessed and deleted or changed.

(a) Hacking: The software is stolen or information is accessed from other computers. This may cause financial loss to the business or violation of privacy rights of the individuals or business.

(b) Spreading virus: Through mail or otherwise, other computers are accessed and the files are erased or contents changed altogether. 'Trojan horses' are implanted to distort the messages and files beyond recovery. This again causes financial loss or mental torture to the individuals.

(c) Health hazard: The computers pose threat during their use as well as during disposal.

3. Problems Related to the Autonomous Nature of Computer

(a) Security risk

(b) Loss of human lives

(c) In flexible manufacturing systems, the autonomous computer is beneficial in obtaining continuous monitoring and automatic control

Role in Technological Development

" Scientist discovers that which exists. An engineer creates that which never was"

- Engineering is the professional art of applying science to the optimum conversion of the resources of nature to the uses of humankind. What Engineers Do?

1. Design products.
2. Design Plants in which those products are made.
3. Design the systems that ensure the quality and efficiency of the manufacturing process.
4. Design, plan and supervise the construction of buildings, highways, transit systems.
5. Develop and implement ways to extract, process and use raw materials such as petroleum and natural gas.
6. Harness the power of the sun, and wind to satisfy the nations power needs.

Engineers as Managers

- The characteristics of engineers as managers are:
- 1. Promote an ethical climate, through framing organization policies, responsibilities and by
- personal attitudes and obligations.
- 2. Resolving conflicts, by evolving priority, developing mutual understanding, generating various
- alternative solutions to problems.
- 3. Social responsibility to stakeholders, customers and employers.
- In fact, the conflict situations should be tolerated, understood, and resolved by participation by all the concerned. They act to develop wealth as well as the welfare of the society.

- The conflicts in case of project managers arise in the following manners:
- (*a) Conflicts based on schedules: This happens because of various levels of execution, priority* and limitations of each level.
- (*b) Conflicts arising out of fixing the priority to different projects or departments.*
- (*c) Conflict based on the availability of personnel.*
- (*d) Conflict over technical, economic, and time factors such as cost, time, and performance* level.
- (*e) Conflict arising in administration such as authority, responsibility, accountability, and logistics* required.
- (*f) Conflicts of personality, human psychology and ego problems.*
- (*g) Conflict over expenditure and its deviations.*

- Most of the conflicts can be resolved by following the principles listed here:
- ***1. People***
- Separate people from the problem
- ***2. Interests***
- Focus must be only on interest
- ***3. Options***
- Generate various options as solutions to the problem. This helps a manager to try the next best solution
- should the first one fails.