



Ethics, Engineering Ethics, Duties, Responsibilities & Obligations of Engineers

Session 24

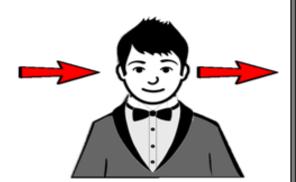
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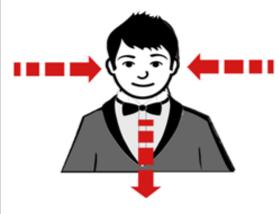




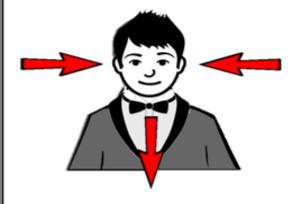
3 Types of Participants



Bad Listener



Medium Listener



Excellent Listener

In fact, effective communication occurs when the right person says the right things to the right people, at the right place, at the right time in the right way to be listened, to be heard and to be understood and to produce the right response.



PART: 1

Ethics



Ethics

Introduction

Derivation of Ethics

The English word *ethics* is derived from the Ancient Greek word *ēthikós* (ἠθικός), meaning "relating to one's character", which itself comes from the root word *êthos* (ἦθος) meaning "character, moral nature". This word was transferred into Latin as *ethica* and then into French as *éthique*, from which it was transferred into English.

The word *ethics* in English refers to several things. It can refer to philosophical ethics or moral philosophy. Ethics can also refer to a common human ability to think about ethical problems that is not particular to philosophy.

A system of moral principles, which means custom, habit, character, a discipline concerned what morally good and bad, and morally right or wrong. A moral is the code of conduct that you develop over time and set for yourself to follow just like being good to everyone. Ethics are the principles accepted by the society and moral standards of human being.



Ethics

Ethical Terms

Ethical (নৈতিক) , Unethical (অনৈতিক), Morals (নৈতিক), Immoral (অনৈতিক), Morally (নৈতিকভাবে),Immorally (অনৈতিকভাবে), Morality (নৈতিকতা), Immorality (অনৈতিকতা), Beliefs (বিশ্বাস), Doubtful, Disbelief (সন্দেহ, সংশয়, অবিশ্বাস), Principled (নীতিবান), Unprincipled (নীতিহীন), Conscience (বিবেক), Unscrupulous (বিবেকবর্জিত), Rights (অধিকার), Right (সঠিক), Wrong, false, deceitful, Good, Bad, Truth, Falsehood; Honesty, Dishonesty, Duty (কর্তব্য), Not performing duties (কর্তব্য না করা), Responsibility, Irresponsibility, Obligations (বাঁধ্যবাধকতা), Disobedience of obligation (অবাধ্যতা), respect to rights (অধিকারের প্রতি সম্মান), No respect for rights (অধিকারের প্রতি সম্মান না করা), Virtues (গুণাবলী),Vices [দোষ ও রিপুসমূহ- Lust / greed লোভ-লালসা/কাম, Anger ক্রোধ, Arrogance অহমিকা, Delusion মোহ, Jealousy/Envy ঈর্ষা/হিংসা, Cowardice কাপুরুষতা।], Corrupt practice (দুর্নীতিগ্রস্ত কাজ), collusive practice, coercive practice, fraudulent practice, Compliance, Non-compliance, Integrity (অখুণ্ডতা, বিশুদ্ধতা), Differences (বিভেদ), Honor (শ্রদ্ধা, সম্মান), Dishonor (অশ্রদ্ধা, অসম্মান), Dignity (মর্যাদা), Indignity (অসমান, অপমান, অমর্যাদা), Trust, mistrust, Sincere, Insincere, honest work, Loyalty, Disloyalty, Partial, Impartial, Biased, Unbiased, Competence, Incompetence, Conflict of Interest – Avoid or Not allowing, Conflict of Interest – Allowing Professionalism, Unprofessionalism, Fidelity (বিশ্বস্তা), Infidelity (অবিশ্বস্ততা), Right activity, Wrong/bad activity, Right work, Wrong/bad work, Right View, Wrong view, Right Intention, Bad intention, Right Speech, Wrong speech, Right Conduct/Action, Misconduct / wrong action, Right Livelihood, Dishonest livelihood, Right Effort, Wrong effort, Right teaching, Bad teaching, Cheating, Plagiarism, Misrepresentation, Sabotage, Duty to take care, Negligence, Bribery, Extortion etc



Ethics

What is meant by Ethics

Ethics is the study of right or wrong, good, bad or evil, duty / obligations, rights and virtues, moral issues and dilemmas, conflicting moral problems associated with the activities.

"Ethics is the study of right and wrong, good and bad, truth and falsehood, duty and obligations, rights and virtues, moral issues, dilemmas, conflicting moral problems and moral judgments associated with our activities.

- An African Fable [উপকথা / উপাখ্যান] – story of four friends: Truth, Falsehood, Water and Fire



Source of Ethics & Ethical Theories

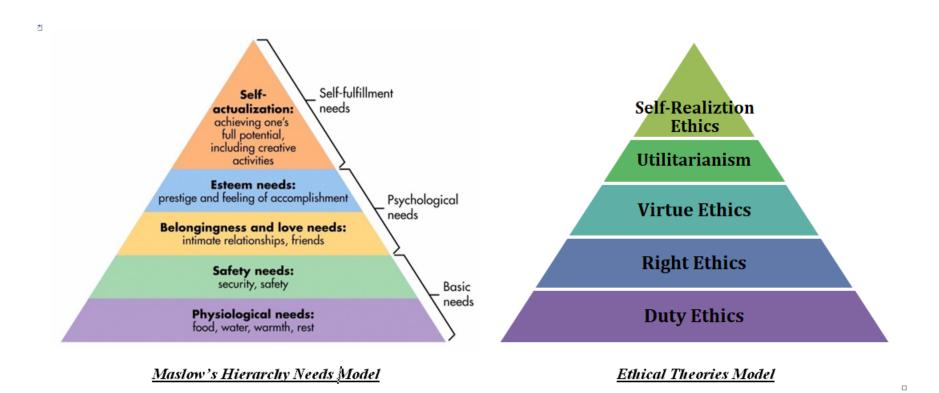
Source of Ethics

Almighty Allah, God, Religion, Thinking and Teachings of philosophers, social thinkers, Culture, Human Consciousness & Conscience, Institution & Professional Bodies etc.

- There are five major types of ethical theories (and traditions) that have been especially influential:-
- Duty Ethics, Rights Ethics, Virtue Ethics, Utilitarianism Ethics and Self-realization Ethics
- We can compare these with the model of Maslow's Five Hierarchy of Needs such as: Physiological Needs, Safety/Shelter Needs, Belongingness & Social Needs, Esteem Needs, and Self-actualization



Source of Ethics & Ethical Theories



Now, we can discuss the ethical theories in detail.



Source of Ethics & Ethical Theories

- Duty Ethics—What is ethical is to perform duties regardless of whether they lead to "good" outcomes. Engineers have duty, responsibility and obligation to Society and uphold Standard & Professional Quality and Safe Design, Assessment of Risk and protection of the Public Health, Safety & Welfare while executing engineering works/activities, duty to profession and demonstrate Professional Competence, maintain Objectivity/Truthfulness, address Conflicts of Interest, duty towards employers, clients, stakeholders, colleagues, employees & subordinates and act as a Faithful Agent and Trustee, preserve Confidentiality, not to receive and provide Gifts and Other Valuable Considerations, not to deceive, not to disrespect, not to cheat, not to break promises/commitment and duty to one's self, and strive for excellence etc.
- **Rights Ethics**—Mirror of Duty Ethics; People have rights that cannot be violated. Engineers are required to respect the rights of all stakeholders such as:- employer, employee, client, customers, contractor, supplier, vendor, supervisor and all concerns those are related with his works/activities.



- Utilitarianism—What is ethical is that which produces the greatest good and maximum benefit for the greatest number.
- Virtue Ethics—Actions reflecting good character traits are good; vices are bad; outcome of action is not relevant.

Virtues are desirable habits and tendencies in action, commitment, motive, attitude, emotion, ways of reasoning and ways of relating to others. For example, professional competence, honesty, courage, fairness, loyalty, humility, public well-being, cooperative practices, personal integrity, courage, self-discipline, perseverance, conscientiousness, fidelity to commitments, self-respect etc.

Vices are incompetence, dishonesty, cowardice, unfairness, disloyalty, arrogance, lust, anger, greed, delusion, envy, disobedience, jealousy etc.

An engineer is essentially required to control all the vices and promote virtues.



Honesty as a Virtue

Honesty is a fundamental virtue for those who engage in the relationship between engineers and their employees and clients. These relationships are based on trust – trust that engineers will effectively perform the service for which they are hired.

Dishonesty undermine the functions of engineers such as – false report data, omit crucial data, designing, construction and production process on which our society depends.

Virtue of professional responsibility means engineers are concern to do the right things, are conscientious and diligent in meeting obligation, are truthful, fair, accountable, answerable or liable for meeting particular obligation.

■ Truth, Truthfulness and Trustworthiness.



■ Self-realization Ethics - Motivating professionalism throughout career, devotion and commitment to professional standards.

Self-realization ethics points to the highly personal commitments that motivate, guide and give meaning to the work of engineers and other professionals.

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 Case example of Spiro T. Agneo, Vice-President, USA in 1973 relating application of ethical theories.



□ Moral Judgment / Moral Responsibility

Moral Judgment are involved whenever moral responsibility is ascribed to someone, but the judgment may be various types. In addition to ascribing (1) a virtue, they may also ascribe (2) obligations, (3) general moral capacities of people or (4) liabilities and accountability for actions, (5) blameworthiness or praiseworthiness.



☐ Moral / Ethical Dilemma

- Moral dilemma can be defined as the process through which individuals try to determine the difference between what is right and wrong, ethical and unethical by using logic. This is an important and often daily process that people use when trying to do the right thing.
- At times, the situations occur where one cannot make immediate decisions as the moral reasons come into conflict. The moral reasons can be rights, duties, virtues or obligations, which make the decision making complex. During their careers, many engineers will become involved in unethical situations they cannot control, possible ethical dilemmas that may occur to determine his or her personal engineering ethics threshold for action; that is, which ethical dilemmas may occur at a workplace before the engineer is forced to an extreme action of leaving the company or fighting for change.

☐ Moral / Ethical Dilemma

- Ethical (or moral) dilemmas are situations in which moral reasons come into conflict, or in which the applications of moral values are unclear, and it is not immediately obvious what should be done. Ethical dilemmas arise in engineering, as elsewhere, because moral values are many and varied, and can make competing claims. Yet, although moral dilemmas comprise the most difficult occasions for moral reasoning, they constitute a relatively small percentage of moral choices, that is, decisions involving moral values. The vast majority of moral choices are clear-cut, although we sometimes fail to act responsibly because of negligence and weakness of will.
- Ethics provides a rational bases for morality and also provides good reason for why something is moral. Ethics provides a set of standard behavior that helps us decide how we ought to act in a range of situations. Ethics is all about making choices and about providing reasons why we should make these choices.

☐ Where and how do Moral Problems Arise in Engineering activities?

- Engineers design and apply the principles of Science and Mathematics' to develop economical solution to technical problems. Engineer's works are to meet societal, customers, consumers and users need. A problem or situation that requires an engineers to choose between alternative that must be evaluated as right (ethical) or wrong (unethical).
- An engineered product or project goes through various stages of conception, design, and manufacture, followed by testing, sales, and service. Engineers carry out or supervise the appropriate activities at whatever stage of this process a convenient division of labor has assigned them. The nature of the activity or project will generally dictate whether the engineers involved are civil, electrical, mechanical, or chemical engineers, to name only a few of the major branches of engineering. Engineers from the different branches or engineering departments may be grouped together in teams, or they may be isolated from each other but with some form of liaison among them.



As engineers carry out their tasks, there will be times when their activities will ultimately lead to a product that is unsafe or less than useful. This may happen intentionally, or under pressure, or in ignorance. A product may be intentionally designed for early obsolescence; an inferior material may be substituted under pressure of time or budget; a product's ultimately harmful effects may not be foreseen. Then too, because of the size of a project, or because of the large numbers of a product sold on the mass market, many people may be affected. And these problems arise quite apart from the temptations of bribes and other forms of outright corruption.



- Making ethical judgments about specific cases and solving problems by applying Frameworks:
- Recognizing an ethical issue
- Consider the parties involved
- Gather all of the relevant information
- Formulate actions and consider alternatives
- Make a decision
- Act
- Reflect on the outcome



PART: 2

Engineering Ethics



Engineering Ethics

- Brief History of Building Codes
- King Hammurabi's Building Code
- Building Code: UK
- Building Code: USA
- Building Code: France and
- Building Code: Bangladesh



- Where does code of ethics come from?
- Concept dates back to antiquity, the phrase code of ethics emerged in written record around 1794.
- The American Medical Association's (AMA) own code of ethics, first drafted in 1847



Structural Disaster & Failures

When the 19th century drew to a close and the 20th century began, there had been series of significant structural failures which had a profound effect on engineers and forced the profession to confront shortcomings in technical and construction practice, as well as ethical standards.

It may be noted here that there were 18 major structural failures in 19th Century, which includes spectacular failure such as:-



Structural Disaster & Failures

- Yarmouth Bridge, UK (1845, died 79),
- Angers Bridge, France (1850, 226 killed),
- The Ashtabula River Railroad Disaster, USA (1876, 92 killed, 64 injured),
- Tay Bridge Disaster, UK (1879, 75 killed),
- Bussuy Bridge Disaster, USA (1887, 38 killed, 40 injured),
- Point Elise Bridge, Canada (1896, 55 killed)
- Quebec Bridge collapse (1907, 75 killed, 11 injured),

These had a profound effect on engineers and forced the profession to confront shortcomings in technical and construction practice, as well as ethical standards which led the formation of Engineering Societies.



Development of Engineering Societies

In the United States growing professionalism gave rise to the development of four founding engineering societies:-

- The American Society of Civil Engineers (ASCE) (1851),
- The American Institute of Electrical Engineers (AIEE) (1884),
- The American Society of Mechanical Engineers (ASME) (1880), and
- The American Institute of Mining Engineers (AIME) (1871).
- The Geological Society of America (1888), and
- The American Society of Heating and Ventilating Engineers (1894)



Development of Engineering Societies

- Professional engineering institutions in the UK began in 1818 with the formation of the Institution of Civil Engineers; The IMechE was formed next in 1847; The IEE was formed in 1871.
- The Engineering Institute of Canada (EIC),1887.
- Japan Society of Civil Engineers (JSCE) was established as an incorporated association in 1914.
- Verein Deutscher Ingenieure (VDI) (English: Association of German Engineers) was established in 1856.



- Development of Engineering Code of Ethics
- USA
- Formal Codes of Ethics by the 03 out of 04 founding engineering societies was developed and AIEE adopted theirs in 1912, ASCE and ASME did so in 1914.
- Development of Professional Engineering concerns for professional practice and protecting the public highlighted by those bridge & structure failures.
- National Society of Professional Engineers (NSPE) released in 1946 its Canons of Ethics for Engineers and Rules of Professional Conduct.



Development of Engineering Code of Ethics

<u>UK</u>

■ The Institution of Civil Engineers of Great Britain seems to have been the first in this respect (1910).

<u>Germany</u>

■ The Association of German Engineers developed an oath for all its members in 1950.

France

■ The first code of ethics adopted in 1997.



Ethics of human character for any engineering venture are expressed as moral principles of conduct. Ethics are the elements which belong to a branch of philosophy dealing with the moral nature of human conduct, or it may be defined as, the principles and standards guiding moral conduct in everyday life or in a special field or profession. The word ethics suggests norms, moral responsibilities, personal values etc. When we talk about engineering profession, we talk about engineer's moral responsibilities and personal. For an example, an engineer, who is trained for technical skills, is required to observe certain code of conduct or norms for his acts or behavior. This code of conduct or behavior pattern is governed by ethical considerations, popularly known as professional ethics. The professional ethics signifies the code of conduct to be adopted in practice by the individuals who are in respective profession.



- The engineering ethics is the field of system of moral principles that apply to practice of engineering and the professional Body of Engineering Profession such as Institute of Engineers, or Council of Engineers which framed Code of ethics to comply and follow these codes of ethics as responsibilities and obligation in discharging professional duties & responsibilities.
- Engineers are required to Comply and follow moral Principles of Code of ethics of what morally /ethically ought to be done or morally /ethically ought not to be done by them in a given situation, what is right or wrong about handling of it or what is good or bad about the Policy, ideas involved and about the people or society and environment. For responsible Professionalism Engineer also focus on the good of Clients and the public at large, which means no harm to be done intentionally. The Code of Professional Conduct in the field of engineering includes avoiding harm, protecting environment, as well as promoting public health, safety and welfare.



- Definition of Engineering Code of Ethics
- Engineering ethics is the study of applied ethics and system of moral principles that apply to the practice of engineering.
- Ethics in engineering is a study of characteristics of morals and conduct of engineers as professionals and individuals as human beings.
- Engineering ethics, where ethics are implemented in engineering by the engineers, is necessary for the good of the society. Engineering Ethics is the study of decisions, policies and values that are morally desirable in engineering practice and research.



- Among the universal ethical values are honesty, integrity, promise-keeping, fidelity, fairness, respect for others, responsible citizenship, pursuit of excellence and accountability." (Michael Josephson)
- It is the study of ethics which resolves around morality the concept of evil and good applied in Engineering Activities in broad ways: safety & honesty.
- Engineering ethics consists of the responsibilities and rights that ought to be endorsed by those engaged in engineering, and also of desirable ideals and personal commitments in engineering. In a second sense, engineering ethics is the study of the decisions, policies, and values that are morally desirable in engineering practice and research. We study engineering ethics for developing Moral Awareness (Proficiency in recognizing moral problems and issues in engineering.),cogent Moral Reasoning (Comprehending, clarifying, and assessing arguments on opposing sides of moral issues.), moral Coherence(Forming consistent and comprehensive viewpoints based on consideration of relevant facts.),moral Imagination(Discerning alternative responses to moral issues and finding creative solutions for practical difficulties.),moral Communication(Precision in the use of a common ethical language, a skill needed to express and support one's moral views adequately to others)

PART: 3

Engineer's Duties, Responsibilities & Ethical Obligations



Engineer's Duties, Responsibilities & Ethical Obligations

Engineering / Professional Duties

Duty implies an obligation or moral commitment which an engineer is expected to perform.

Engineering / Professional Responsibilities

Responsibility refers to the liability which is assumed or accepted by a engineer, as a part of his job role or position.

Engineering / Professional / Ethical Obligations

An act or course of action to which a person is morally or legally bound; a duty or commitment.



Engineer's Duties, Responsibilities & Ethical Obligations

- A code of professional ethics results when a field organizes itself into a profession. The resulting code is central to advising those professionals how to conduct themselves, to judge their conduct and to understand the profession and what their professional responsibilities in conducting their professional activities.
- Engineers are called upon to address problems and issues both internally and professionally that cannot be resolved just through the application of engineering methods alone.



Professional Ethical Obligations

- Primary: Obligations to the Public
- Secondary: Obligations to Employer or Client
- Tertiary: Obligations to Other Professionals and Other Parties & Stakeholders.



- Eight Principles Impacting professional Obligations:-
- 1. Upholding Standard & Professional Quality
- 2. Protecting The Public Health, Safety and Welfare
- 3. Demonstrating Professional Competence
- 4. Maintaining Objectivity/Truthfulness



- Eight Principles Impacting professional Obligations:-
- 5. Faithful Agent/ trustee, Loyalty and addressing conflict of interest and deception.
- 6. Preserving Confidentiality
- 7. Receiving and Providing Valuable Consideration
- 8. Emerging Areas/Emerging Challenges



Principles Impacting professional Obligations

1. Upholding Standard & Professional Quality

- Responsibility to uphold integrity, honor, dignity and values of engineering profession and commitment not to allow anything goes against the society and public interest.
- Responsibility to maintain high standard of Professional quality and fair treatment, loyalty & accountability to employer, client and customers.
- Responsibility and Obligation to maintain high standard of personal behavior in a responsible manner, principle of informed consent and exercise responsibilities in an ethical manner.
- Support professional and technical societies of engineering discipline.
- Shall provide opportunities and support for the professional development of the engineers under supervision.



Principles Impacting professional Obligations

2. Protecting The Public Health, Safety and Welfare

- Conformance with Applicable Standards
- Approval/Signing and Sealing of Engineering
- Drawings
- Responsible Charge/Responsible Control
- Safety, Health & Welfare issues, Risk Assessment and mitigation of risk.
- Safe product design, safe engineering design, construction, supervision and Quality Control of product and engineering process & activities.
- Environmental Sustainability and no harm to environment
- Awareness of Safety Violations



3. Demonstrating Professional Competence

- Education, Experience, Qualifications
- Acceptance of Assignment
- Signing and Sealing of Work
- Coordination of Work
- Scope of Practice
- Maintain high standard of Professional quality and fair treatment, loyalty & accountability to employer, client and customers



4. Maintaining Objectivity / Truthfulness/Non-Deception

- Inclusion of All Relevant Information
- Issuance of Public Statements
- Disclosure to Interested Parties
- Expression of Technical Opinions
- Reviewing Work of Another



5. Faithful Agent/ trustee, Loyalty and addressing conflict of interest and deception.

- Faithful Agent and Trustee
- Avoid vs. Disclosure
- Serving on Public Bodies
- Accepting Contracts from Government Bodies
- Part-Time Engineering Work
- Contingent Fee Arrangements
- Representing Adversary Interests
- Consent



6. Preserving Confidentiality

- Business or Technical Affairs of Employers/Clients
- Proprietary Information/Files
- Arranging for New Employment or Business Opportunities
- Consent
- Upholding honesty, truth, trade secret, confidentiality, data integrity / misrepresentation of data & information etc.



7. Receiving and Providing Gifts and Other Valuable Consideration

- Accepting Consideration from Suppliers for Specifying Product
- Accepting Commissions/Allowances Directly from
- Contractors
- Political Contributions
- Corrupt Practices, Corruptions, Bribery, Extortion and Political influence, fraudulent, collusive or coercive practices, and theft.
- Awareness of Illegal Practice



- Corrupt Practice, Corruption, Bribery includes-
- 1) Corrupt Practices, Corruption & Bribery in the public, private and development sectors;
- 2) Corrupt Practices, Corruption & Bribery by the organization;
- 3) Corruption & Bribery by the organization's personnel acting on the organization's behalf or for its benefit;
- 4) Corruption & Bribery by the organization's business associates acting on the organization's behalf or for its benefit;



- Corrupt Practice, Corruption, Bribery includes-
 - 5) Corruption & Bribery of the organization;
 - 6) Corruption & Bribery of the organization's personnel in relation to the organization's activities;
 - 7) Corruption & Bribery of the organization's business associates in relation to the organization's activities;
 - 8) Direct and Indirect Corruption & Bribery (e.g. bribe offered or accepted through or by a third party).



- Corrupt Practice, Corruption, Bribery includes-
 - 9) Corrupt practice also includes conflict of interest with employer, clients, friend, relations and business associate or with a public servant with whom he is dealing at that time and concealing such conflict of interest is unethical.
 - 10) Corrupt practice includes corruption, fraudulent, collusive or coercive practices.
- Fraudulent Practice- A deceitful practice, misrepresentation, intentional and a lie.
- Collusive Practice- Harming or threatening to harm, directly or indirectly in collusion with others.
- Coercive Practice- Impairing or harming, or threatening to impair or harm, directly or indirectly to achieve a wrongful gain using influence or force.



8. Emerging Areas/Emerging Challenges

- Technology
- Use of Internet and Electronic Practice
- Promoting innovative emerging technology
- Sustainable Design/Development
- Alternative Project Delivery
- Integrated Project Delivery
- Building Information Modeling
- Complying Standards, Specifications, Rules, Regulations, Safety Codes, Building Codes to tackle emerging challenges.



PART: 4

IEB Code of Ethics and Rules of Ethics for Professional Engineer



- 1. As a member of professional body of Engineers:
- A. Shall uphold and advance the integrity, honor and dignity of the engineering profession using my knowledge and skill.
- B. Engineers shall hold paramount the safety, health and welfare of the public in the performance of their professional duties.
- C.shall try to comply with the principles of sustainable development in the performance of my professional duties.



- 2. Shall be honest and impartial and serve with complete fidelity the public, employer and clients. Shall not accept remuneration for services rendered other than that from my employer or with my employer's permission.
- 3. Shall perform services only in areas of competence.
- 4. Shall build professional reputation on the merit of services and shall not compete unfairly with others.



- 5. Shall act in professional matters for employer or client as faithful agent or trustee and shall avoid conflict of interest and avoid deceptive acts.
- 6. Shall issue public statements only in an objective and truthful manner, and shall not in a self-laudatory language or in any manner derogatory to the dignity of the profession or professional bodies, neither advise or write articles for publication, nor shall authorize such advertisements to be written or published by any other person.



- 7. Without disclosing the fact to employer in writing shall not be director of or have a substantial financial interest in, nor be an agent for any company, firm or person carrying on any contracting consulting or manufacturing business which is or may be involved in the work to which my employment relates, nor shall receive directly or indirectly any royalty, gratuity or commission or any article or process used in or for the purpose of the work in respect of which you are employed unless or until such royalty, gratuity or commission has been authorized in writing by the employer,
- 8. Shall support the professional and technical societies of engineering discipline.



- 9. In connection with work in country other than own, shall order professional conduct according to these rules, as far as they are applicable; but where the country has recognized standards of professional conduct, shall adhere to them.
- 10. Shall not offer, guide, solicit or receive, either directly or indirectly any political contribution in an amount intended to influence the award of a contract by the public authority.
- 11. Shall avoid bribery and extortion in any form. If encounter such acts done by any member, engineers shall be ethically bound to report it to the Ethics Board.



- 12. Shall continue my professional development throughout career, and shall provide opportunities and support for the professional development of the engineers under supervision
- 13. A member who shall be convicted by a competent tribunal of criminal offence, which in the opinion of the disciplinary body renders him unfit to be a member, shall be deemed to have been guilty of improper conduct.



Rules of Ethics and Conduct for Professional Engineers

- 1. Social Responsibility to uphold Ethical Values of the Society.
- 2. Responsibility to Maintain High Standards of Professional Quality
- 3. Obligation to Maintain High Standard of Personal Behavior in a Responsible Manner.



Questions?

