Professional Ethics and Values in Engineering   (HS317)

Unit 1: Scope, Human Values: Morals, Values and Ethics – Integrity – Work Ethic – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – Caring - Sharing – Honesty – Courage – Valuing Time – Co-operation – Commitment – Empathy – Self-Confidence – Character – Spirituality, Engineering as experimentation - engineers as responsible experimenters - codes of ethics - a balanced outlook on law, The code of ethics for engineers - NSPE *guidelines - Fundamental principles.*

Scope:

Engineering is transforming science into useful products for human comfort. Engineering is something that engineers do, and what they do has profound effects on others. Ethics in engineering then is the ability as well as responsibility of an engineer to judge his decisions from the context of the general wellbeing of the society. It is the study of moral issues that confront engineers and engineering organizations when some crucial decisions are taken. Engineering research and practice requires that the task being performed considers all the pros and cons of a certain action and its implementation. Professional engineering bodies like IEEE, ASME, IEI etc., have evolved comprehensive ethics codes relevant to their respective professions, based on the rich experience of their members. Independent organizations like NSPE have prepared value based ethical codes applicable to all engineering professions. Teaching engineering ethics in academic institutions is undertaken largely through many case studies for creating awareness interactively among engineering students of all disciplines. By studying engineering ethics, the students develop awareness and assessment skill of the likely impact of their future decisions on moral and ethical grounds. Ethical standards in engineering are influenced by many factors: 1.Engineering as an experimentation for the good of mankind is a notable factor involving far reaching consequence, 2. Ethical dilemmas make engineering decisions relatively difficult to make. 3. Risk and safety of citizens as a social responsibility is a prime concern of an engineer, 4. Technological advancement can be very demanding on the engineering skill in the global context, 5. Moral values and responsible conduct will play a crucial role in decision making.

The study of engineering ethics within an engineering program helps students prepare for their professional lives. A specific advantage for engineering students who learn about ethics is that they develop clarity in their understanding and thought about ethical issues and the practice in which they arise. The study of ethics helps students to develop widely applicable skills in communication, reasoning and reflection. These skills enhance students' abilities and help them engage with other aspects of the engineering program such as group work and work placements.

Professional ethics

Profession is a commitment to a designated and organized occupation by virtue of being an authority over a body of knowledge with requisite skills acquired through specialized training. An occupation becomes a profession when a group of people sharing the same occupation work together in a morally acceptable way with members setting and following a certain ethics code. A professional is a practitioner belonging to a specific profession. Professional ethics, as opposed to personal values and morality, is a set of ethical standards and values a practicing engineer is required to follow. It sets the standards for professional practice, and is only learned in a professional school or while practicing ones own profession. Today, it is an essential part of professional education because it helps students deal with issues they will face.

The scope of engineering ethics envelopes diverse activities like
1. Engineering as a social experimentation
2. Engineers responsibility for safety
3. Role of engineers, managers, consultants etc.
4. Rights of engineers
5. Moral reasoning and ethical theories
6. Responsibility to employers
7. Global issues and concerns

The best way to teach engineering ethics is by using case studies—not just the disaster cases that make the news, but the kinds of cases that an engineer is more likely to encounter. Many real time cases are available or some hypothetical cases can be constructed and there are methods for analyzing them. Engineering ethics can be taught in a free-standing course, but there are strong arguments for introducing ethics in technical courses as well. If the subject of professional ethics is how members of a profession should, or should not, affect others in the course of practicing their profession, then engineering ethics is an essential aspect of engineering itself and education in professional responsibilities should be part of professional education in engineering, just as it is in law and medicine.

Professional Codes of Ethics

A code of ethics prescribes how professionals are to pursue their common ideal so that each may do the best at a minimal cost to oneself and those they care about. The code is to protect each professional from certain pressures (for example, the pressure to cut corners to save money) by making it reasonably likely (and more likely then otherwise) that most other members of the profession will not take advantage. A code is a solution to a coordination problem. A professional has obligations to the employer, to customers, to other professionals- colleagues with specific expectations of reciprocity.

Individual Responsibility:

An individual in his professional capacity has responsibility for the regular tasks he is assigned, for the outcomes of the actions and decisions. A professional is answerable and liable for the actions. He should have the capacity and moral strength to defend his actions/decisions. Individuals may fail for one or the other of the following reasons: 1. failure to meet minimum appropriate standards or falling very much below expectations due to negligence, 2. deliberate underperformance

Human values; morals, values and ethics

For understanding of how in order for individuals, organizations and societies to endure and function effectively, it is essential that an individual's positive exalting forces be rediscovered and revitalized. Human values embrace the entire range of values pertinent to the human condition, interest, behavior, and aspiration. While laws are a set of rules for personal or corporate behavior and working against such rules will attract recrimination and punishment, morals on the other hand are a set of standards for personal behavior and ethics are a set of standards for professional behavior. Morals and ethics are self imposed or regulated and voluntary when broadly interpreted.

Work ethic

 Work ethic is a set of values based on hard work and diligence. It is also a belief in the moral benefit of work and its ability to enhance character. A work ethic may include being reliable, having initiative, or pursuing new skills.

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

Benjamin Franklin wrote:

'Remember, that *time is money*. He that can earn ten shillings a day by his labor, and goes abroad, or sits idle, one half of that day, though he spends but sixpence during his diversion or idleness, ought not to reckon *that* the only expense; he has really spent, or rather thrown away, five shillings besides. ... Remember, that money is the *prolific, generating nature*. Money can beget money, and its offspring can beget more, and so on. Five shillings turned is six, turned again is seven and three pence, and so on, till it becomes a hundred pounds. The more there is of it, the more it produces every turning, so that the profits rise quicker and quicker. He that kills a breeding sow, destroys all her offspring to the thousandth generation. He that murders a crown, destroys all that it might have produced, even scores of pounds.'

Criticism of work ethic

Countercultural groups, most notably slacker, hippie and hacker communities, have challenged these values in recent decades, characterizing them as submissive to authority and social convention, and not valuable in and of themselves, but only if it brings a positive result. An alternative perspective has arisen in recent years, suggesting that the work ethic is being subverted in a broader, more mainstream and more readily marketed-to proportion of society. This perspective has given rise to the phrase "work smart".

In the 19th century, the Arts and Crafts movement of William Morris in the UK and Elbert Hubbard in the US noted how "alienation" of workers from ownership of the tools of production and their work product was destructive of the work ethic because in the expanding firms of that era, the workers saw no point in doing more than the minimum. The notion of work ethic was revised to include giving up control over the work process to management so that the latter could study and "rationalize" the work process, and the notion of work ethic thereafter included acknowledgment of management control. Good work ethics includes a positive attitude with all work projects, being prepared to go the extra mile to get things done, creating a work environment where great teamwork can flourish and having the capacity to encourage the best performance standards from your fellow workers.

Service learning

Service-Learning is a teaching and learning strategy that integrates meaningful community service with instruction and reflection to enrich the learning experience, teach civic responsibility, and strengthen communities.

Through service-learning, young people—from kindergarteners to college students—use what they learn in the classroom to solve real-life problems. They not only learn the practical applications of their studies, they become actively contributing citizens and community members through the service they perform.

Service-learning can be applied in a wide variety of settings, including schools, universities, and community-based and faith-based organizations. It can involve a group of students, a classroom or an entire school. Students build character and become active participants as they work with others in their school and community to create service projects in areas such as education, public safety, and the environment.

University students in Michigan looked for ways to support struggling local non-profit organizations during difficult economic times. Graduate communication students honed their skills while providing a wide variety of public relations services with community partners, including developing press kits and managing event coordination.

Service-learning is an education and youth development strategy that connects learning objectives with meaningful service to the community. Students build civic, leadership, and academic skills while strengthening communities through service. Benefits include improved academic achievement, increased student engagement and civic skills, and stronger communities.

Civic virtue
Civic virtue is the moral underpinning of how a citizen behaves and is involved in society. It is a standard of righteous behavior in relation to a citizens' involvement in society. A individual may exhibit civic virtue by voting, volunteering and organizing other community activities. Without an understanding of civic virtue, citizens are less likely to look beyond their families, friends and economic interests. They are less likely to help others in the community, to volunteer their time, to give to nonprofit organizations or to participate in group activity that benefits society. Related ideas for civic virtue are citizenship, philanthropy, public good, voluntarism and social capital.

Valuing Time:
A first step in good time management is to understand the value of your time.

 If you are employed by someone else, you need to understand how much your employer is paying for your time, and how much profit he or she expects to make from you. If you are working for yourself, you should have an idea of how much income you want to bring in after tax. By working these figures back to an hourly rate, this gives you an idea of the value of your time.

By knowing the value of your time, you should be able to tell what tasks are worthwhile to perform, and which tasks give a poor return. This helps you cut away the low value jobs, or argue for help with them.

Respect for others

Respect for others is based on self-respect. It really is following the Golden Rule: Do unto others as you would have others do unto you.

Being a polite and courteous person makes one a rare individual in today's world. Politeness, and a genuine concern for the rights and feelings of others in our society seems to have slammed the door in our faces. A culture of rudeness has become a feature of modern society. Whether it's loud cellphone

conversations, line cutting, or terrible customer service by staff people, finding politeness in the world is on the decline.

You can very easily find people who view politeness and good manners as weakness and as character flaws to be overcome. They argue that rudeness succeeds and common courtesy is a mark of failure. They view rudeness to others as a sign of their superiority as people, and a badge of their status. They couldn't be more wrong. Politeness and common courtesy are more likely to achieve success, in business and in life, than a selfish, bullying attitude.

Whether in your personal relationships with others, or in your company, being polite and well mannered pays off in many ways. In your personal life, remembering special days, holding doors, and displaying good manners in general shows respect for the other person. That respect will almost always be reciprocated by the other person.

Word of your genuine concern, for treating others fairly and with respect, will improve your company's public image dramatically. Customers and clients will refer your business to their friends and family, resulting in even more personal referrals. Good old fashioned word of mouth advertising, through testimonials from satisfied customers is a powerful marketing tool. Everyone wants to be treated with respect, and in the modern decline of manners, your business politeness will shine like a beacon in the darkness.

Contrary to the criticism that good manners are a display of weakness, polite and respectful actions are a sign of self confidence. They are also recognition that everyone deserves to be treated with dignity. Instead of taking their money and running, missing their appointments, or barging past them in lineups, you are showing you value their time and rights, as well your own.

In a world where good manners are in steep decline, your polite actions will help you to stand out. You definitely won't be seen as a doormat. There is a huge difference between providing service and being subservient. Service implies an equal respect for yourself and others. Being subservient is based on a lack of self respect, and has nothing to do with being polite. Show your respect for yourself and others. Display your good manners today.

Peaceful living:

Our principle of **'Peaceful living'** centers on the ethical and sustainable application of technologies which would aim to provide basic needs for everyone without compromising the planet's resources.

Sustainability

Sustainability can be expressed as meeting present ecological, societal, and economical needs without compromising these factors for future generations.

Sustainable design encompasses the development of appropriate technology which is a staple of sustainable living practices. Sustainable development in turn is the use of these technologies in infrastructure. Evidence from the earliest hominid remains suggest that one of the keys to the divergence of Homo Sapiens from apes came about through an increasing and varied use of tools. Tool complexity eventually became more and more complex, finally evolving into the myriad of technologies we rely on today.

It would appear therefore that whilst there are humans there will always be the development of technologies to shape the world we live in.

Ethics of technology
The Ethics of Technology is a sub-field of Ethics and generally sub-divided into two areas:

- The ethics involved in the development of new technology – whether it is always, never, or contextually right or wrong, to invent and implement a technological innovation.
- The ethical questions that are exacerbated by the ways in which technology extends or curtails the power of individuals – how standard ethical questions are changed by the new powers.

In 1998 UNESCO set up its **Ethics of Science and Technology Programme** which aims 'to promote consideration of science and technology in an ethical framework by initiating and supporting the process of democratic building.'

Likewise The Centre for Technology and Ethics is a collaboration of three universities in the Netherlands (Delft, Eindhoven, Twente) which aims:
- To stimulate and undertake interdisciplinary and applied research in the field of ethics and technology;
- To stimulate and undertake fundamental research in ethics relevant for the field of ethics and technology;
- To stimulate and undertake activities in the field of teaching in ethics and technology;
- To act as an intermediary between the philosophy departments involved in the three universities. Ethics on the one hand and public debates and the media on the other.
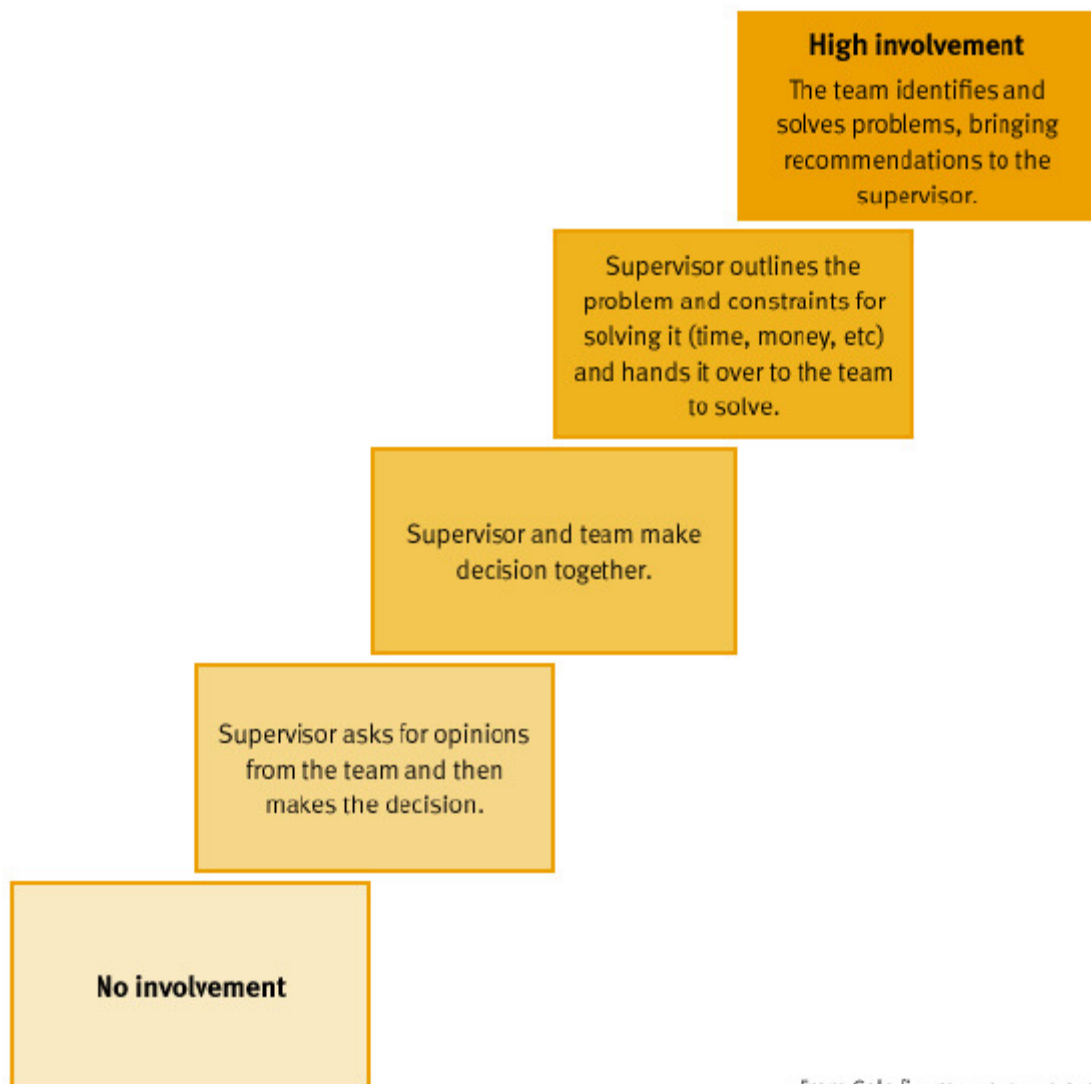
Commitment and cooperation:
Commitment means acceptance of the responsibilities and duties and cooperation means help and assistance. By developing team commitment and cooperation in a work team you are assisting the team to meet its goals and objectives. Work teams that are committed and cooperative are more likely to achieve the goals the business has set.

There are a number of signals that indicate the work team is committed and cooperating. These include:

- maintaining or increasing quality

- reaching or exceeding production targets

- decreasing complaints from team members

- limited conflict between team members

- fewer workplace injuries.

There are degrees of team involvement in decision making. Your knowledge of the skills and abilities of the team members will guide your decision about the extent supported employees can contribute to making a decision. There are no rules for when and how team members should be involved. It is a matter for your judgement. The following diagram shows the degrees of involvement team members may have. At the highest level of involvement the team identifies and solves problems, and brings recommendations to the supervisor. At the lowest level of involvement the team plays no role in the decision making at all. Between these two extremes the supervisor and team may make the decision together, or the supervisor may outline the problem and constraints for solving it (time, money, etc) and hand it over to the team to solve.

High involvement
The team identifies and solves problems, bringing recommendations to the supervisor.

Supervisor outlines the problem and constraints for solving it (time, money, etc) and hands it over to the team to solve.

Supervisor and team make decision together.

Supervisor asks for opinions from the team and then makes the decision.

No involvement

From Cole figure 7.10, page 213

Involving team members in decision making, which can include problem solving, should be based on whether one or more of the following is met:

- The need for acceptance. The greater the need for the team to accept your decisions, the more you should involve them.
- The effect the decision will have on the team. The more the problem or decision affects the team, the more you should involve them.
- Their involvement in implementing the decision. If the team will be implementing or carrying out the decision, involve them.
- The ability and desire of the group to become involved. If the team wants to be involved, consider involving them, particularly if they have sufficient knowledge or expertise in the issue involved. Even if they do not, it could be useful for training and development purposes.

Empathy
Empathy is the ability to mutually experience the thoughts, emotions, and direct experience of others. The ability to understand another person's circumstances, point of view, thoughts, and feelings is empathy. When experiencing empathy, you are able to understand someone else's internal experiences.

Self-confidence
Self-confidence relates to self-assuredness in one's personal judgment, ability, power, etc., sometimes manifested excessively. Being confident in yourself is infectious if you present yourself well, others will want to follow in your foot steps towards success.
Promise yourself, no matter how difficult the problem life throws at you, that you will try as hard as you can to help yourself. You acknowledge that sometimes your efforts to help yourself may not result in success, as often being properly rewarded is not in your control.

Self-esteem has been directly connected to an individual's social network, the activities they participate in, and what they hear about themselves from others. Positive self-esteem has been linked to factors such as psychological health, mattering to others, and both body image and physical health. On the contrary, low self-esteem has been associated with the outcomes of depression, health problems, and antisocial behavior. Usually, adolescents of poor health will display low self-esteem. Globally, self-confidence in boys and girls will decline during adolescence, and in contrast to boys, girls' self-confidence won't shoot back up again until early adulthood.

During adolescence, self-esteem is affected by age, race, ethnicity, puberty, health, body height, body weight, body image, involvement in physical activities, gender presentation, gender identity, and awakening or discovery of sexuality. Self-confidence can vary and be observed in a variety of dimensions. Components of one's social and academic life affect self-esteem. An individual's self-confidence can vary in different environments, such as at home or in school.

Spirituality:

Spirituality is the concept of an ultimate or an alleged immaterial reality, an inner path enabling a person to discover the essence of his/her being; or the "deepest values and meanings by which people live. Spiritual practices, including meditation, prayer and contemplation, are intended to develop an individual's inner life. Spiritual experiences can include being connected to a larger reality, yielding a more comprehensive self; joining with other individuals or the human community; with nature or the cosmos; or with the divine realm. Spirituality is often experienced as a source of inspiration or orientation in life. It can encompass belief in immaterial realities or experiences of the immanent or transcendent nature of the world.

Traditionally, many religions have regarded spirituality as an integral aspect of religiou experience. Among other factors, declining membership of organized religions and the growth of secularism in the western world have given rise to a broader view of spirituality. The term "spiritual" is now frequently used in contexts in which the term "religious" was formerly employed; compare James 1902 lectures on the "Varieties of Religious Experience".

Secular spirituality emphasizes humanistic ideas on moral character (qualities such as love, compassion, patience, tolerance, forgiveness, contentment, responsibility, harmony, and a concern for others) - aspects of life and human experience which go beyond a purely materialist view of the world without necessarily accepting belief in a supernatural reality or divine being. Spiritual practices such as mindfulness and meditation can be experienced as beneficial or even necessary for human fulfillment without any supernatural interpretation or explanation. Spirituality in this context may be a matter of nurturing thoughts, emotions, words and actions that are in harmony with a belief that everything in the

universe is mutually dependent; this stance has much in common with some versions of Buddhist spirituality. A modern definition is as follows:

"Spirituality exists wherever we struggle with the issues of how our lives fit into the greater scheme of things. This is true when our questions never give way to specific answers or give rise to specific practices such as prayer or meditation. We encounter spiritual issues every time we wonder where the universe comes from, why we are here, or what happens when we die. We also become spiritual when we become moved by values such as beauty, love, or creativity that seem to reveal a meaning or power beyond our visible world. An idea or practice is "spiritual" when it reveals our personal desire to establish a felt-relationship with the deepest meanings or powers governing life."

Examples:
- Computers:
    – Developed & adopted over about three decades
    – Significant impacts on society:
        - Not well understood or nor always predicted, e.g:
            – The Y2K bug
    – However largely accepted as a positive technology
- Nuclear power stations
    – Developed & adopted over about three decades
    – Significant impacts on society:
        - Not well understood nor always predicted, eg. Chernobyl
    – Widespread concern & installed capacity in decline

Experimental Attributes of Engineering:
- Incomplete understanding of implications:
    – Insufficient time or money
    – Commercial advantage (desire for secrecy)
    – Uncertainty about impacts (sometimes unknowable)
- Participation of experimental subjects:
    – Products or services often target non-engineers
    – Subjects share responsibility if voluntarily accept risk
- Reasons for monitoring outcomes:
    – Commercial purposes (e.g. product improvement)
    – Precautionary purposes (e.g. manage risk)

Nature of Subjects
- Subjects:
    – Individual consumers, groups or society as a whole:
        - Those who can make informed choices, and
        - Those requiring advocates:
            – Disadvantaged, future generations, other species & the environment
- Impacts:
    – Health, safety & the environment
    – Changes to social structure & social status:
        - Income & wealth distribution
        - Lifestyles & personal empowerment
        - Education, culture

Features

- Absence of a 'control group' (equivalent non-participants):
  - Products & services usually offered to all
  - Benefits may such that they can't be withheld from a particular group
- Society may have little prior understanding:
  - Innovative products & services
  - Uncertainty in future impacts (positive or negative)
- Informed judgements are difficult to make:
  - For both experimenter and subject

Summary

- Engineering is a form of social experimentation:
  - Innovation with social & environmental impacts
  - Uncertainty & risk in outcomes
- Stakeholders have a right to informed consent:
  - Information, opportunity, decision making capability
- Problems in implementation:

A balanced outlook on Law

The 1969 Santa Barbara offshore spill of 235,000 gallons of crude oil blackened 30 miles of spectacular beaches, damaged wildlife, and hurt the local tourist trade. Predictably, the disaster prompted demands for new laws and tighter controls to prevent such occurances in the future. A group of Southern Californians staged a burning of gasoline credit cards of the offending oil company. Unioin oil, only to be taken to task by alocal newspaper for taking the wrong aim. The newspaper argued that gas station operators who would suffer the most by a boycott are not at fault.

NSPE CODE OF ETHICS FOR ENGINEERS

Preamble

Engineering is an important and learned profession. As members of this profession, engineers are expected to exhibit the highest standards of honesty and integrity. Engineering has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require honesty, impartiality, fairness, and equity, and must be dedicated to the protection of the public health, safety, and welfare. Engineers must perform under a standard of professional behavior that requires adherence to the highest principles of ethical conduct.

I. Fundamental Canons

Engineers, in the fulfillment of their professional duties, shall:

1. Hold paramount the safety, health, and welfare of the public.
2. Perform services only in areas of their competence.
3. Issue public statements only in an objective and truthful manner.
4. Act for each employer or client as faithful agents or trustees.
5. Avoid deceptive acts.
6. Conduct themselves honorably, responsibly, ethically, and lawfully so as to enhance the honor, reputation, and usefulness of the profession.

II. Rules of Practice

1. Engineers shall hold paramount the safety, health, and welfare of the public.

a. If engineers' judgment is overruled under circumstances that endanger life or property, they shall notify their employer or client and such other authority as may be appropriate.
b. Engineers shall approve only those engineering documents that are in conformity with applicable standards.
c. Engineers shall not reveal facts, data, or information without the prior consent of the client or employer except as authorized or required by law or this Code.
d. Engineers shall not permit the use of their name or associate in business ventures with any person or firm that they believe is engaged in fraudulent or dishonest enterprise.
e. Engineers shall not aid or abet the unlawful practice of engineering by a person or firm.
f. Engineers having knowledge of any alleged violation of this Code shall report thereon to appropriate professional bodies and, when relevant, also to public authorities, and cooperate with the proper authorities in furnishing such information or assistance as may be required.

2. Engineers shall perform services only in the areas of their competence.
a. Engineers shall undertake assignments only when qualified by education or experience in the specific technical fields involved.
b. Engineers shall not affix their signatures to any plans or documents dealing with subject matter in which they lack competence, nor to any plan or document not prepared under their direction and control.
c. Engineers may accept assignments and assume responsibility for coordination of an entire project and sign and seal the engineering documents for the entire project, provided that each technical segment is signed and sealed only by the qualified engineers who prepared the segment.

3. Engineers shall issue public statements only in an objective and truthful manner.
a. Engineers shall be objective and truthful in professional reports, statements, or testimony. They shall include all relevant and pertinent information in such reports, statements, or testimony, which should bear the date indicating when it was current.
b. Engineers may express publicly technical opinions that are founded upon knowledge of the facts and competence in the subject matter.
c. Engineers shall issue no statements, criticisms, or arguments on technical matters that are inspired or paid for by interested parties, unless they have prefaced their comments by explicitly identifying the interested parties on whose behalf they are speaking, and by revealing the existence of any interest the engineers may have in the matters.

4. Engineers shall act for each employer or client as faithful agents or trustees.
a. Engineers shall disclose all known or potential conflicts of interest that could influence or appear to influence their judgment or the quality of their services.
b. Engineers shall not accept compensation, financial or otherwise, from more than one party for services on the same project, or for services pertaining to the same project, unless the circumstances are fully disclosed and agreed to by all interested parties.
c. Engineers shall not solicit or accept financial or other valuable consideration, directly or indirectly, from outside agents in connection with the work for which they are responsible.

d. Engineers in public service as members, advisors, or employees of a governmental or quasi-governmental body or department shall not participate in decisions with respect to services solicited or provided by them or their organizations in private or public engineering practice.

e. Engineers shall not solicit or accept a contract from a governmental body on which a principal or officer of their organization serves as a member.

5. Engineers shall avoid deceptive acts.

a. Engineers shall not falsify their qualifications or permit misrepresentation of their or their associates' qualifications. They shall not misrepresent or exaggerate their responsibility in or for the subject matter of prior assignments. Brochures or other presentations incident to the solicitation of employment shall not misrepresent pertinent facts concerning employers, employees, associates, joint venturers, or past accomplishments.

b. Engineers shall not offer, give, solicit, or receive, either directly or indirectly, any contribution to influence the award of a contract by public authority, or which may be reasonably construed by the public as having the effect or intent of influencing the awarding of a contract. They shall not offer any gift or other valuable consideration in order to secure work. They shall not pay a commission, percentage, or brokerage fee in order to secure work, except to a bona fide employee or bona fide established commercial or marketing agencies retained by them.

III. Professional Obligations

1. **Engineers shall be guided in all their relations by the highest standards of honesty and integrity.**
a. Engineers shall acknowledge their errors and shall not distort or alter the facts.
b. Engineers shall advise their clients or employers when they believe a project will not be successful.
c. Engineers shall not accept outside employment to the detriment of their regular work or interest. Before accepting any outside engineering employment, they will notify their employers.
d. Engineers shall not attempt to attract an engineer from another employer by false or misleading pretenses.
e. Engineers shall not promote their own interest at the expense of the dignity and integrity of the profession.
2. **Engineers shall at all times strive to serve the public interest.**
a. Engineers are encouraged to participate in civic affairs; career guidance for youths; and work for the advancement of the safety, health, and well-being of their community.
b. Engineers shall not complete, sign, or seal plans and/or specifications that are not in conformity with applicable engineering standards. If the client or employer insists on such unprofessional conduct, they shall notify the proper authorities and withdraw from further service on the project.
c. Engineers are encouraged to extend public knowledge and appreciation of engineering and its achievements.
d. Engineers are encouraged to adhere to the principles of sustainable development[1]in order to protect the environment for future generations.
3. **Engineers shall avoid all conduct or practice that deceives the public.**
a. Engineers shall avoid the use of statements containing a material misrepresentation of fact or omitting a material fact.
b. Consistent with the foregoing, engineers may advertise for recruitment of personnel.
c. Consistent with the foregoing, engineers may prepare articles for the lay or technical press, but such articles shall not imply credit to the author for work performed by others.

4. **Engineers shall not disclose, without consent, confidential information concerning the business affairs or technical processes of any present or former client or employer, or public body on which they serve.**
   a. Engineers shall not, without the consent of all interested parties, promote or arrange for new employment or practice in connection with a specific project for which the engineer has gained particular and specialized knowledge.
   b. Engineers shall not, without the consent of all interested parties, participate in or represent an adversary interest in connection with a specific project or proceeding in which the engineer has gained particular specialized knowledge on behalf of a former client or employer.
5. **Engineers shall not be influenced in their professional duties by conflicting interests.**
   a. Engineers shall not accept financial or other considerations, including free engineering designs, from material or equipment suppliers for specifying their product.
   b. Engineers shall not accept commissions or allowances, directly or indirectly, from contractors or other parties dealing with clients or employers of the engineer in connection with work for which the engineer is responsible.
6. **Engineers shall not attempt to obtain employment or advancement or professional engagements by untruthfully criticizing other engineers, or by other improper or questionable methods.**
   a. Engineers shall not request, propose, or accept a commission on a contingent basis under circumstances in which their judgment may be compromised.
   b. Engineers in salaried positions shall accept part-time engineering work only to the extent consistent with policies of the employer and in accordance with ethical considerations.
   c. Engineers shall not, without consent, use equipment, supplies, laboratory, or office facilities of an employer to carry on outside private practice.
7. **Engineers shall not attempt to injure, maliciously or falsely, directly or indirectly, the professional reputation, prospects, practice, or employment of other engineers. Engineers who believe others are guilty of unethical or illegal practice shall present such information to the proper authority for action.**
   a. Engineers in private practice shall not review the work of another engineer for the same client, except with the knowledge of such engineer, or unless the connection of such engineer with the work has been terminated.
   b. Engineers in governmental, industrial, or educational employ are entitled to review and evaluate the work of other engineers when so required by their employment duties.
   c. Engineers in sales or industrial employ are entitled to make engineering comparisons of represented products with products of other suppliers.
8. **Engineers shall accept personal responsibility for their professional activities, provided, however, that engineers may seek indemnification for services arising out of their practice for other than gross negligence, where the engineer's interests cannot otherwise be protected.**
   a. Engineers shall conform with state registration laws in the practice of engineering.
   b. Engineers shall not use association with a nonengineer, a corporation, or partnership as a "cloak" for unethical acts.
9. **Engineers shall give credit for engineering work to those to whom credit is due, and will recognize the proprietary interests of others.**
   a. Engineers shall, whenever possible, name the person or persons who may be individually responsible for designs, inventions, writings, or other accomplishments.
   b. Engineers using designs supplied by a client recognize that the designs remain the property of the client and may not be duplicated by the engineer for others without express permission.

c. Engineers, before undertaking work for others in connection with which the engineer may make improvements, plans, designs, inventions, or other records that may justify copyrights or patents, should enter into a positive agreement regarding ownership.
d. Engineers' designs, data, records, and notes referring exclusively to an employer's work are the employer's property. The employer should indemnify the engineer for use of the information for any purpose other than the original purpose.
e. Engineers shall continue their professional development throughout their careers and should keep current in their specialty fields by engaging in professional practice, participating in continuing education courses, reading in the technical literature, and attending professional meetings and seminars.

Footnote 1 "Sustainable development" is the challenge of meeting human needs for natural resources, industrial products, energy, food, transportation, shelter, and effective waste management while conserving and protecting environmental quality and the natural resource base essential for future development.