G.H.RAISONI COLLEGE OF ENGINEERING & MANAGEMENT

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OBJECTIVES (WHY ENGINEERING ETHICS?)

The objectives of this course on 'Professional Ethics and Human Values' are:

(*a*) to understand the moral values that ought to guide the Engineering profession,

(*b*) resolve the moral issues in the profession, and

(c)   justify the moral judgment concerning the profession. It is intended to develop a set of beliefs, attitudes, and habits that engineers should display concerning morality.

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

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

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

(B)   To *act* in morally desirable ways, towards moral commitment and responsible conduct
6. Moral reasonableness i.e., willing and able to be morally responsible.
7. Respect for persons, which means showing concern for the well-being of others, besides oneself.
8. Tolerance of diversity i.e., respect for ethnic and religious differences, and acceptance of reasonable differences in moral perspectives.
9. Moral hope i.e., believe in using rational dialogue for resolving moral conflicts.
10. Integrity, which means moral integrity, and integrating one's professional life and personal convictions.

MORALS

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

Morality is concerned with principles and practices of morals such as:

(*a*) What ought or ought not to be done in a given situation?

(*b*) What is right or wrong about the handling of a situation? and

(*c*) What is good or bad about the people, policies, and ideals involved?

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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.

As against morals and ethics, laws are norms, formally approved by state, power or national or international political bodies. Breaking the norms is called *crime*, and invite specific punishment.

VALUES

Definition

Humans have the unique ability to define their identity, choose their values and establish their beliefs. All three of these directly influence a person's behavior. People have gone to great lengths to demonstrate the validity of their beliefs, including war and sacrificing their own life! Conversely, people are not motivated to support or validate the beliefs of another, when those beliefs are contrary to their own.

People will act congruent with their personal values or what they deem to be important.

"A value is defined as a principle that promotes well-being or prevents harm." Another definition is: *"Values are our guidelines for our success—our paradigm about what is acceptable."* Personal values are defined as: *"Emotional beliefs in principles regarded as particularly favorable or important for the individual."* Our values associate emotions to our experiences and guide our choices, decisions and actions.

A person's observations on its environment are filtered through his values to determine whether or not he should expend energy to do something about his experiences. A person who values gold and sees a large bag of gold (a positive value) in his path as he walks, will be motivated to reach down and pick it up. A person who values his life and knows about venomous snakes will retreat from the sound of a rattlesnake (a negative value) from nearby, when he is walking in the desert. Said in another way, *"Values are the scales we use to weigh our choices for our actions, whether to move towards or away from something."*

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Not all values have the same weight or priority. Some are more important than others and must be satisfied before others can be addressed. **Dr. Abraham Maslow** illustrated this with his hierarchy of human needs. Survival has a higher priority than security, which has a higher priority than social acceptance. Self-esteem can only be addressed to the degree that social acceptance is fulfilled. Similarly, self-actualization can only be pursued to the degree that self-esteem has been satisfied.

A person's beliefs, values and identity are usually acquired unconsciously based on his personal experience or observations of others' experiences as to what produces desirable or undesirable results in the environment. A baby's learning *to walk and talk* is a clear example of identifying with human adults, valuing the act of being able to have the mobility and communication ability of an adult and the belief, based on unconscious observation, that humans can do walk and do talk with each other.

Physiologists have identified the parts of the human brain that are involved in producing behavior in accordance with beliefs and values. All information collected by human senses is passed through a net-like group of cells, known as the Reticular Activating System (RAS), located near the top of the brain stem. The RAS compares the data received with accepted values, positive and negative (threats), and beliefs stored in memory and determines whether or not immediate action is required. The results of the RAS's comparison are communicated to the 'amygdala' near the mid-brain.

The 'amygdala' produces neuro-chemicals that cause emotions consistent with the nature of and proportional to the match between environment and values and beliefs. The neuro-chemicals initiate the chemical processes needed for the action to be taken. If the emotions produced are strong enough, the perceived information is blocked from reaching the logical, rational and conscious executive center of the brain, the pre-frontal lobes. In which case, the resulting behavior will be automatic, not necessarily logical or rational, and completely in accordance with the person's strongest held beliefs, values and/or identity.

By positive affirmations, one can modify or create new beliefs about a person's identity and/or what is important to him (values). Verbal repetition of statements intended to become new beliefs, and values will result in these being stored for use by the RAS for comparison with the environment being experienced. This is the mechanism how the beliefs or values are modified.

Types of Values

The five core human values are: (1) Right conduct (2) Peace (3) Truth (4) Love and (5) Non-violence.

1. Values related to RIGHT CONDUCT are:
    (a) SELF-HELP SKILLS: Care of possessions, diet, hygiene, modesty, posture, self reliance, and tidy appearance.
    (b) SOCIAL SKILLS: Good behavior, good manners, good relationships, helpfulness, no wastage, and good environment, and
    (c) ETHICAL SKILLS: Code of conduct, courage, dependability, duty, efficiency, ingenuity, initiative, perseverance, punctuality, resourcefulness, respect for all, and responsibility.

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2. Values related to PEACE are: Attention, calmness, concentration, contentment, dignity, discipline, equality, equanimity, faithfulness, focus, gratitude, happiness, harmony, humility, inner silence, optimism, patience, reflection, satisfaction, self-acceptance, self-confidence, self-control, self- discipline, self-esteem, self-respect, sense control, tolerance, and understanding.

3. Values related to TRUTH are: Accuracy, curiosity, discernment, fairness, fearlessness, honesty, integrity (unity of thought, word, and deed), intuition, justice, optimism, purity, quest for knowledge, reason, self-analysis, sincerity, sprit of enquiry, synthesis, trust, truthfulness, and determination.

4. Values related to LOVE are: Acceptance, affection, care, compassion, consideration, dedication, devotion, empathy, forbearance, forgiveness, friendship, generosity, gentleness, humanness, interdependence, kindness, patience, patriotism, reverence, sacrifice, selflessness, service, sharing, sympathy, thoughtfulness, tolerance and trust.

5. Values related to NON-VIOLENCE are:

   (a) PSYCHOLOGICAL: Benevolence, compassion, concern for others, consideration, forbearance, forgiveness, manners, happiness, loyalty, morality, and universal love.

   (b) SOCIAL: Appreciation of other cultures and religions, brotherhood, care of environment, citizenship, equality, harmlessness, national awareness, perseverance, respect for property, and social justice.

PERSEVERANCE is defined as persistence, determination, resolution, tenacity, dedication, commitment, constancy, steadfastness, stamina, endurance and indefatigability. To persevere is described as to continue, carry on, stick at it (in formal), keep going, persist, plug away, (informal), remain, stand firm, stand fast, hold on and hang on. Perseverance builds character.

ACCURACY means freedom from mistake or error; conformity to truth or to a standard or model and exactness. Accuracy is defined as correctness, exactness, authenticity, truth, veracity, closeness to truth (true value) and carefulness. The value of accuracy embraces a large area and has many implications. Engineers are encouraged to demonstrate accuracy in their behavior through the medium of praise and other incentives. Accuracy includes telling the truth, not exaggerating, and taking care over one's work.

DISCERNMENT means discrimination, perception, penetration, and insight. Discernment means the power to see what is not obvious to the average mind. It stresses accuracy, especially in reading character or motives. Discrimination stresses the power to distinguish or select what is true or genuinely excellent. Perception implies quick and often sympathetic discernment, as of shades of feelings. Penetration implies a searching mind that goes beyond what is obvious or superficial. Insight suggests depth of discernment.

Definitions of other terms are given in the appropriate pages of this book.

Evolution of Human Values

The human values evolve because of the following factors:

1. The impact of norms of the society on the fulfillment of the individual's needs or desires.

2. Developed or modified by one's own awareness, choice, and judgment in fulfilling the needs.

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3. By the teachings and practice of Preceptors (Gurus) or Saviors or religious leaders.

4. Fostered or modified by social leaders, rulers of kingdom, and by law (government).

ETHICS

Ethics is the word that refers to morals, values, and beliefs of the individuals, family or the society. The word has several meanings. Basically it is an activity and process of inquiry. Secondly, it is different from non-moral problems, when dealing with issues and controversies. Thirdly, ethics refers to a particular set of beliefs, attitudes, and habits of individuals or family or groups concerned with morals. Fourth, it is used to mean 'morally correct'.

The study on ethics helps to know the people's beliefs, values, and morals, learn the good and bad of them, and practice them to maximize their well-being and happiness. It involves the inquiry on the existing situations, form judgments and resolve the issues. In addition, ethics tells us how to live, to respond to issues, through the duties, rights, responsibilities, and obligations. In religion, similar principles are included, but the reasoning on procedures is limited. The principles and practices of religions have varied from to time to time (history), region (geography, climatic conditions), religion, society, language, caste and creed. But ethics has grown to a large extent beyond the barriers listed above. In ethics, the focus is to study and apply the principles and practices, universally.

1.3.1 Three Types of Ethics or Morality

As ethical commitment is core of professionalism, we must know more on the ethics, especially to professional ethics. How do professional ethics differ from other types of ethics, such as philosophical ethics, business ethics and personal ethics? We begin discussion on the three types of ethics or morality.

1. Common Morality

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

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

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

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

2. Personal Morality

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

3. Professional Ethics (Role Morality)

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

1. *Formal code*: Unlike common morality and personal morality, professional ethics is usually stated in a formal code. Many such codes are promulgated by various components of the profession. The codes of ethics of Professional societies are called as 'code of professional responsibility or professional conduct.' Many engineering societies have a code of ethics, such as the American Society of Mechanical Engineers, Institution of Engineers, India etc. These codes of ethics differ in some important ways. For example, in engineering, some of the codes have begun to make reference to the environment and sustainable development, where as others still do not.

2. *Focus*: The professional codes of ethics of a given profession focus on the issues that are important in that profession. Professional codes in the legal profession concern themselves with questions such as perjury of clients and the unauthorized practice of law. Perjury is not a relevant issue to medicine. In engineering, the code of the Association for Computing Machinery sets out regulations for privacy, IP, copyrights and patents. Such topics are not covered in many other engineering codes.

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3. *Precedence*: In a professional relationship, professional ethics takes precedence over personal morality. This characteristic has an advantage, but it can also produce complications. The advantage is that a client can justifiably have some expectations of a professional, even if the client has no knowledge of the personal morality of the professional. When a client or employer reveals details of a business relationship to an engineer, he expects the engineer to keep these details in confidence, even though he knows nothing about the personal morality of the engineer. The expectations are based only on the knowledge of the professional ethics of engineering.

A complication occurs when the professional's personal morality and professional ethics conflict. A compromise is often seen as the best reconciliation between the rights and autonomy of the engineer and the rights and autonomy of the client or employer. Suppose a client asks a civil engineer to design a project that the engineer, who has strong personal environmental commitments, believes that unacceptable damage will be caused to a wetland. Assuming that this damage is not sufficiently clarified by his engineering code, the engineer can refer the client or employer to another engineer who might do the work.

Restriction: The professional ethics sometimes differs from personal morality in its degree of restriction of personal conduct. Sometimes professional ethics is more restrictive than personal morality, and sometimes it is less restrictive. Suppose one engineer refuses to design military hardware because she believes war is immoral. Engineering codes do not prohibit engineers from designing military hardware, so this refusal is based on personal ethics and not on professional ethics. Her personal ethics is more restrictive than professional ethics. In a different example, a civil engineer refuses to participate in the design of a project that he believes will be contrary to the principles of sustainable development, which are set out in the codes of Society of Civil Engineers. He may not personally believe these guidelines are correct, but might (correctly) believe he is obligated to follow them in his professional work because they are stated in his code of ethics. Here, the professional ethics is more restrictive than his personal ethics. Such differences in the degree of restriction between personal and professional ethics may occur in other professions as well. With regard to confidentiality, it is felt that confidentiality in engineering can be broken if the public interest requires it. Further, professional ethics in engineering can be different from an engineer's personal ethics.

4. *Two dimensional*: Professional ethics, like any ethics, has a negative as well as a positive dimension. Being ethical has two aspects: (*a*) preventing and avoiding evil, and (*b*) doing or promoting good. We may call them as the two dimensions or faces of ethics: the negative face and the positive face. On the one hand, we should not lie, cheat or steal and sometimes we have an obligation to see that others do not do so as well. On the other hand, we have some general obligation to promote human well-being. This general obligation to avoid evil and do good, is intensified and made more specific when people occupy special roles and have special relationships with others.

Sometimes the conflicts between professional ethics, personal morality, and common morality are difficult to resolve.

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

INTEGRITY

Integrity is defined as the unity of thought, word and deed (honesty) and open mindedness. It includes the capacity to communicate the factual information so that others can make well-informed decisions. It yields the person's 'peace of mind', and hence adds strength and consistency in character, decisions, and actions. This paves way to one's success. It is one of the self-direction virtues. It enthuse people not only to execute a job well but to achieve excellence in performance. It helps them to own the responsibility and earn self-respect and recognition by doing the job.

Moral integrity is defined as a virtue, which reflects a consistency of one's attitudes, emotions, and conduct in relation to justified moral values. Further discussion on this is available in Chapter 2.

WORK ETHICS

Industry and Society are the two systems which interact with each other and are interdependent. Society requires industry/business system which provides manufacturing, distribution and consumption activities. It needs investment (capital input), labor (input), supply (raw materials), production (industries, business organizations), marketing and distribution (transport), and consumption (public, customer). A lot of transactions (and interactions) between these sub-systems involving people are needed for the welfare of the society. It is here, the work ethics plays an essential role.

Work ethics is defined as *a set of attitudes concerned with the value of work, which forms the motivational orientation*. The 'work ethics' is aimed at ensuring the economy (get job, create wealth, earn salary), productivity (wealth, profit), safety (in workplace), health and hygiene (working conditions), privacy (raise family), security (permanence against contractual, pension, and retirement benefits), cultural and social development (leisure, hobby, and happiness), welfare (social work), environment (anti-pollution activities), and offer opportunities for all, according to their abilities, but without discrimination.

Many complex social problems exist in the industrial/business scenario, because:

1. The people desire to be recognized as individuals and treated with dignity, as living human beings. Work is intrinsically valuable so far as it is enjoyable or meaningful in allowing personal expression and self-fulfillment. Meaningful work is worth doing for the sense of personal identity and the self-esteem it holds.

2. Economic independence: Work is the major instrumental good in life. It is the main source of providing the income needed to avoid economic dependence on others, for obtaining desired materials and services, and for achieving status and recognition from others.

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3. Pay as well as the pace of work should be in commensurate with the expertise required, acquired, and utilized in the persons. Exploitation and bargained pay should be discouraged.

4. Privacy (personal freedom) of the employee, including women, is to be protected. At the same time, confidentiality of the employer is also to be protected. Mutual trust and loyalty both ways play major roles in this aspect.

5. Security during job and upon retirement: This concept is being accepted only in government jobs, public limited companies, and corporate organizations. The western thought has influenced the Indian private industries and multinationals in a paradigm shift from 'life-long employment' to policies such as 'merit only', 'hire and fire', 'pay and use' etc. This situation has no doubt created tension in the Indian scene.

6. Recognition to non-work activities, such as leisure, paid holiday on the day of visit of a dignitary, social service, and other developmental activities. The workers in prosperous countries are less willing to consider 'work' as their prime interest in life. They claim that such service activities give them *peace of mind* and *happiness*. However, such a trend is likely to decline the work ethics.

7. Hard work and productivity are very essential for the success of an industry. The quality of work life deserves to be improved. Hard labor, undignified jobs (human-drawn *rikshaw*, people carrying night soil), and hazardous jobs are to be made less straining, dignified, and safer. Automation and CNC systems to a large extent have been successful in lessening the human burden. Still, many a hard work can not be replaced by 'virtual work', in the near future.

8. Employee alienation: Absence of or inadequate 'recognition and reward system' and 'grievance redressal system', lack of transparency in policy implementation, factions in trade unions etc. lead to ethical problems, affecting the work ethics. Participative management, quality circles, job rotation, and flexible working hours are some of the measures to counter this situation.

9. A different view of work ethics: Work is considered as a necessary evil. It is a thing one must do in order to avoid worse evils, such as dependency and poverty. That is a major source of anxiety and unhappiness.

10. As per the Protestant Work Ethics, the financial success is a sign that is favored by God. It means making maximal profit is a duty mandated by God. It is to be obtained rationally, diligently, and without compromising with other values such as spending time with one's family and not exploiting or harming others[1].

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To work (job), is not for monetary considerations only. Human beings believe that it is good to work. Work is good for the body and mind. It promotes self-respect, self-esteem, good for the family, and obligation to the society and allow the world to prosper. Work lays a moral and meaningful foundation for life. That is why, work ethics affirms that, the work *per se* is worthy, admirable and valuable at personal and social levels. It improves the quality of life and makes life purposeful, successful, and happy.

By work ethics, duties to the self, family, society, and nation are fulfilled. Rights of the individuals are respected and nourished. Values and virtues are cultivated and enjoyed by all human beings. Further, the quality of life is improved and the environment protected. On the other hand, unemployment and under-employment lead to frustration, social tensions, and occasional militancy. For a developing economy and society, like ours, we need to *promote work ethics*, at all levels, to flourish as developed nation.

SERVICE LEARNING

Service learning refers to learning the service policies, procedures, norms, and conditions, other than 'the technical trade practices'. The service learning includes the characteristics of the work, basic requirements, security of the job, and awareness of the procedures, while taking decisions and actions. It helps the individuals to interact ethically with colleagues, to effectively coordinate with other departments, to interact cordially with suppliers as well as the customers, and to maintain all these friendly interactions.

Alternatively, the service learning may be defined as the *non-paid activity*, in which service is provided on voluntary basis to the public (have-nots in the community), non-profitable institutions, and charitable organizations. It is the service during learning. This includes training or study on real life problems and their possible solutions, during the formal learning, i.e., courses of study. In the industrial scenario, adoption, study, and development of public health or welfare or safety system of a village or school is an example of service learning by the employees. The engineering student analyzing and executing a socially-relevant project is another example of service learning.

The service learning is a methodology falling under the category of experiential education[3]. It is one of the forms of experiential learning and community service opportunities. It is distinguished in the following ways:

1. *Connection to curriculum*: Integrating the learning into a service project is a key to successful service learning. Academic ties should be clear and built upon existing disciplinary skills.

2. *Learner's voice*: Beyond being actively engaged in the project, trainees have the opportunity to select, design, implement, and evaluate their service activity.

3. *Reflection*: Structured opportunities are created to think, talk, and write about the service experience. The balance of reflection and action allows the trainee to be constantly aware of the impact of their *work*.

4. *Partners in the community*: Partnership with community agencies are used to identify genuine needs, provide mentorship, and contribute input such as labor and expertise towards completing the project.

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VIRTUES

Virtues are *positive* and *preferred* values. Virtues are desirable attitudes or character traits, motives and emotions that enable us to be successful and to act in ways that develop our highest potential. They energize and enable us to pursue the ideals that we have adopted. Honesty, courage, compassion, generosity, fidelity, integrity, fairness, transparency, self-control, and prudence are all examples of virtues.

Virtues are tendencies which include, solving problems through peaceful and constructive means and follow the path of the golden mean between the extremes of 'excess and deficiency'. They are like habits, once aquired, they become characteristics of a person. Moreover, a person who has developed virtues will naturally act in ways consistent with moral principles. The virtuous person is the ethical person.

Civic Virtues

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

The duties are:

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

the rights are:

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

George Washington[4] embodied the civic virtues as indispensable for a self-governing administration.

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