Engineering Ethics

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Ethics: refers to the standards of conducts, standards that indicate how one should behave based on moral duties and virtues, which are derived from the principles of right and wrong.  Engineering ethics: The study of moral values, issues and decisions involved in engineering practice.  Moral values include   * Responsibility * Ideals * Character traits * Social policies * Relationship between individual and corporation | Moral | | Ethics | How to deal with ethical problems: 6 steps | 3 types of inquiries | | | |
| Refers to personal behavior  We do it because we believe it to be right or wrong  Social convention about right and wrong  Refers to any kind of human action | | Refers to professional behavior  We do it because society says it’s the right thing to do  Critical reflection about what one does and why one does it  Involves defining, analyzing, evaluating, resolving, and developing moral criteria to guide human behavior | 1. Recognize the problem 2. Gather information and define the problem 3. Generate alternative solutions 4. Evaluate benefits and cost of alternative solutions 5. Decision making and optimization 6. Implement the best option | Normative  Based on values  Identify and justify morally desirable norms or standards that should guide individual and groups  3 components:   1. The fundamental canon 2. The rules of practice 3. Professional obligations   Reasoning:  Def: focus on finding the best or at least the reasonably better means for obtaining goals, health safety etc.  2 types:   1. Practical Reasoning: use different methods (math and science) 2. Ethical reasoning: societal life, justice, equality, freedom, safety, health | | Conceptual  Based on meaning  Clarify the meaning of concept/ideas/principals that are expressed by words or by questions and statements  Ethical framework: 5   1. Rights 2. Virtue 3. Utilitarian 4. Justice 5. Ethics care   \*\*\*\*Integrity: qualification of being honest and having strong moral principles and moral uprightness | Factual  Based on facts  Descriptive inquiry  Obtain facts needed for understanding and resolving value issues  Facts provide both reasons and way to resolve moral problems |
| 4 fundamental aspects:   1. Identify and enlist the type of ethical issues 2. Clarify the related concept theories 3. Guide and help in resolving and confronting ethical and moral dilemmas 4. Stimulate critical and responsible reflection and useful discussion on these topics | Why?   * Receive inputs in  1. Basic engineering science 2. Design 3. Manufacture 4. Software skill 5. Technical problem-solving ability | | Moral autonomy: concerned with decision making power of a person with regard to ethical issues.   * Skill/habit of thinking rationally about ethical issues   Engineering ethics: 2 types: | |
| Micro  Typical problems  Everyday  Professional level | Macro  Unknown  Sudden  Regional and national level  Societal problem |
| 3 reasons of unethical behavior:   * Resource crunch * Attitude * Opportunity   Moral dilemma: is a problem in the decision-making process between two possible options, neither of which is absolutely acceptable from an ethical perspective.   * Refers to situations when difficult choice has to be made based on conflicting moral issues involved   Solution: 3 steps   1. Refute the dilemma 2. Value theory approach 3. Find alternative solution | 3 ways to solve conflict problem: | | Profession: is a life career which requires special knowledge, practical training, and continuous in-service training with a clearly defined membership of a particular group evolving its own codes of ethics.  Professional Engineer: who earns a degree in engineering at an institution approved and recognized by duty constituted authority like AICTE (All India Council for Technical Education) | | | |
| Easy Choice:  most significant and important | Creative Middle Choice:  Finding out and attempting some kind of compromise that will at least partially satisfy available choice | Hard Choice:  When both the choice is not feasible | 4 senses   1. Field of inquiry and activity 2. Distinguish between moral and non-moral problems 3. Refers to a particular set of beliefs, attitudes, and habit that a person / group display 4. Refers to principal of ideas, obligation and rights which are morally justified   Typical ethical issues that engineer encounter: | | | 6 roles:   1. Savior: protects society from harmful effects 2. Guardian: know the best option in technological advancement 3. Bureaucratic servant: receive and translate the directive of his superiors 4. Social servant: provide service with responsibilities and satisfy desire of society 5. Social enabler and catalyst: help and understand what the society needs and make decisions 6. Game player: play according to economic game rule   2 dimensions:   1. Social responsibility 2. Professional responsibilit | |
| 1. Safety 2. Acceptable risk 3. Compliance 4. Confidentiality 5. Environmental health 6. Data integrity 7. Conflict of interest | | 1. Honesty and dishonesty 2. Fairness 3. Societal impact 4. Accounting for uncertainty |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Moral Development Theory | | | | | | Ethical Theories: 4 (religious, duty, util, kant) | | Use of ethical theories | Code of ethics |
| Kohlberg’s Theory: ethics of rules and rights: 3 level | | | Gilligan’s theory: ethics of care: 3 levels | | | 1. Virtue   Oldest ethical theory  Wisdom  Enables good judgement  Follow moral virtue  Integrity, honesty, self-respect, responsibility | 1. Duty 2. Rights | 1. Help us understand and resolve moral dilemmas 2. Help to justify moral obligations 3. Help to relate professional morality and general morality   Kan’t approach: 4 steps   * If something is wrong --- always wrong * Happiness != morality * Treat others the way you like to be treated * Imagine the situation from both point of view | Def: set of principles and rules used by individuals and organizations to govern their decision-making process as well as to distinguish right from wrong  Consider 5 things:   1. Individuality 2. Objectivity 3. Confidentiality 4. Professional competence 5. Professional behavior |
| Pre-conventional Level | Conventional Level | Post-conventional Level | Pre-conventional Level | Conventional Level | Post-conventional Level |
| Most primitive level  Satisfy themselves  Obey authority implicitly to escape punishment  Mainly this behavior is seen in children  Many of the grown-ups don’t raise themselves above this level.  Any conduct is done which benefits individuals | Loyalty and identifications are hallmarks at this level  Satisfy others  Obey authority implicitly in cost of own interest  Most adults do not cross or think beyond this stage | Individuals at this able can think of principles of rights, right conduct and general good regardless of convention and individual interest.  Do what is morally reasonable and maintain integrity  Don’t follow customs  They’re called autonomous and are not influenced by the customs and beliefs unless they are for public good | Self-centered reasoning | Think about others  Don’t hurt them  Willing to help and nurture others | Balance between caring for others and establish their individual rights and interests. | 1. Utilitarianism   Def: It means maximizing the utility which again points to producing most goods for most people  Overall balance of good over bad consequence  2 types: | |
| Act-utilitarianism | Rule-utilitarianism |
| Refers to result of a single action | Refers to result of following a rule of conduct  Satisfy rational desire |