

**GE6075 PROFESSIONAL ETHICS IN ENGINEERING****UNIT I HUMAN VALUES**

**SYLLABUS:** Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self-confidence – Character – Spirituality – Introduction to Yoga and meditation for professional excellence and stress management.

**Course Objectives:** To create awareness on professional ethics and Human Values

**1. What are human values?**

Values decide the standard of behavior. Some universally accepted values are freedom justice and equality. Other principles of values are love, care, honesty, integrity, self-respect.

**2. What are ethical values?**

Trustworthiness, respect, responsibility, fairness, caring is ethical values

**3. Distinguish values from ethics and culture.**

Values are mainly related to individuals and since they are related to justice, they remain the same for everyone. E.g. truth, honesty, empathy, self respect. Values do not change from individual to individual. Ethics is common to a group of individuals; the group may be religious or professional. Ethics is mostly based on some code or law and judgment of any action is based on code of conduct or law. Ethics change from individual to individual Culture commonly refers to conduct of a group. E.g system of worship, marriage. It may differ from society to society, nation to nation or religion to religion.

**4. What is integrity?**

Integrity is the unity of character based on moral values. Consistency in attitudes, emotions and conduct in relations to morally justified actions and values are also the part of integrity of individual. It implies honesty, trustworthiness.

**5. Define work ethics**

By one's work one cannot harm others. Any worker cannot escape accountability. Worker has the moral responsibility to see that no other person's right, private or freedom is impaired or transgressed.

**6. What is service learning?**

Service learning tells that one has moral responsibility to increase the desirable effects and to decrease the harmful effects. Any service should increase the desirable result.

**7. Mention some civic virtues?**

Good citizen demand civic virtue. It is the principle of not harming the surroundings .it also includes living peacefully, respect for others, protecting the environment and being normally and ethically good.

**8. Write short notes on caring and sharing.**

Caring is the essence of moral life. Caring involves feelings, relationship, contends with other persons and protecting others and causing least damage to others. Sharing means sharing of feelings, ideas

thoughts, resources and profits. Sharing is always mutually beneficial. Sharing morally acceptable feelings, resources and materials is a value.

**9. Write notes on honesty.**

Any human being should imbibe honesty-honesty in acts, honesty in speech and honesty in beliefs. Honesty is the fundamental virtue in human relationship even though it may be difficult to follow some times.

**10. What is courage as a value?**

Courage implies self-respect and governs confrontations with danger and risk. It is not excessive rashness or cowardice, but it is the middle ground. Taking calculated risks and boldness in facing crises are the hallmarks of courage as a human value. It defines the mental make up of an individual in taking bold decisions even under adverse situations.

**11. Define co-operation.**

Co-operation means extending help to others, for a good cause. Co-operation may be through an idea, a suggestion, an assistance or physical work which extends to others for common benefit.

**12. Define empathy.**

Empathy means putting self in a position of someone else and thinking as the other and reasoning suitable action.

**13. Define spirituality.**

Spirituality raises a man above the materialistic world into a realm where he seeks peace and real happiness.

**14. Define Integrity?**

Integrity is the bridge between responsibility in private and professional life.

**15. Define Compromise?**

In a negative sense it means to undermine integrity by violating one's fundamental moral principles. In a positive sense, however, it means to settle differences by mutual concessions or to reconcile conflicts through adjustments in attitude and conduct.

**16. Give the two aspects of Honesty?**

Truthfulness – meeting responsibilities concerning truth-telling. Trustworthiness – Meeting responsibilities concerning trust.

**17. Differentiate Self-respect and Self-esteem?**

Self-respect: It is a moral concept; refers to the virtue properly valuing oneself.

Self-esteem: It is a psychological concept; means having a positive attitude toward Oneself, even if the attitude is excessive or otherwise unwarranted.

**18. What are Human values? Explain briefly.**

Values are the rules by which we make decisions about right and wrong, should and shouldn't, good and bad. "Emotional beliefs in principles regarded as particularly favorable or important for the individual."

**Types of Values: (a) Right conduct, (b) Peace (c) Truth, (d) Love, (e) Nonviolence.**

**19. Factors That Demonstrate a Strong Work Ethic:**

- Integrity,
- Sense of Responsibility, Emphasis on Quality, Discipline, and
- Sense of Teamwork.

**20. Five Characteristics of a Good Work Ethic:**

Reliability, Dedication, Productivity, Cooperation, and Character

**21. Explain CIVIC VIRTUE.**

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.

Civic virtues are divided into four categories:

1. Civic Knowledge
2. Self-Restraint
3. Self-Assertion
4. Self-Reliance

**22. Explain Respect for others.**

Respect is a positive feeling of admiration or deference for a person. Respect can be a specific feeling of regard for the actual qualities of the one respected. It can also be conduct in accord with a specific ethic of respect. Treating people with respect makes your world a nicer place to live in, whether it's at home, at school, or out in your community. Don't insult people or make fun of them.

**23. Explain Living Peacefully.**

To live peacefully, one should start install peace within (self). Charity begins at home. Then one can spread peace to family, organization where one works, and then to the world, including the environment. Only who are at peace can spread peace. You cannot gift an article which you do not possess. The essence of oriental philosophy is that one should not fight for peace. It is oxymoron. War or peace can be won only by peace, and not by wars !

One should adopt the following means to live peacefully, in the world

**24. Explain Stress Management.**

Stress management refers to the wide spectrum of techniques and psychotherapies aimed at controlling a person's levels of stress, especially chronic stress, usually for the purpose of improving every day functioning. Stress is a normal psychological and physical reaction to the ever-increasing demands of life.

Surveys show that many Americans experience challenges with stress at some point during the year.

**25. Define spirituality? (Nov/Dec 15)**

Spirituality raises a man above the materialistic world into a realm where he seeks peace and real happiness

**26. Explain Self- Confidence, Character and Spirituality.(May/June 16)**

**Self- Confidence:** Certainty in one's own capabilities, values, and goals. These people are usually positive thinking, flexible and willing to change. They respect others so much as they respect themselves. **Character:** To determine the ideals.

**Spirituality:** Spirituality is a way of living that emphasizes the constant awareness and recognition of the spiritual dimension (mind and its development) of nature and people, with a dynamic balance between the material development and the spiritual development.

**27. What are the values? (May/June 16)**

Values denote something's degree of importance, with the aim of determining what action of life is best to do or live or to describe the significance of different actions.

**28. What are the qualities of a self-confident people? (Nov/Dec 15)**

1. Ambitious
2. Self-Love
3. Risk-takers
4. Self-awareness
5. Change agent

**Part –B (16 marks)**

1. Write short notes honesty. (R) (Nov/Dec 2015)
2. What is courage? What are the salient features of courage?(R) (Nov/Dec 2015)
3. What is service learning?(R)
4. Distinguish values from ethics and culture.(U)
5. What do you understand by the term spirituality? Explain in detail.(U)(May/June 16)
6. Spirituality raises a man above the materialistic world into a realm where he seeks peace and real happiness (E)
7. Define the terms Values, Morals & Ethics?(R)
8. Define Human Values? (R)
9. Explain the importance of self-confidence in ethics(U)(May/June 2016)

**Course Outcome:** Students understand the core values that shape the ethical behavior of an engineer and Exposed awareness on professional ethics and human values.

**UNIT II ENGINEERING ETHICS**

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

**COURSE OBJECTIVES:** To create awareness on Engineering Ethics providing basic knowledge about engineering Ethics, Variety of moral issues and Moral dilemmas, Professional Ideals and Virtues.

**PART A****1. Define moral Dilemma? (MAY/JUNE 2012)**

Dilemmas are certain kind of situations in which a difficult choice has to be made. Moral dilemmas can also be called moral problems. Moral Dilemmas have two or more folding's - moral obligations, duties, rights, goods, or ideals come disagreement with each other.

**2. What are the chief characteristics of a profession? (MAY/JUNE 2012)**

Knowledge Organization Public Good

**3. What is the significance of engineering ethics? (MAY/JUNE 2011)**

An activity and an area of inquiry. Ethical problems, issues and controversy Set of beliefs, attitudes and habits. Morally correct.

**4. What is engineering ethics? (MAY/JUNE 2011, MAY/JUNE 2014)**

Study of the moral issues and decisions confronting individuals and organizations engaged in engineering / profession. Study of related questions about the moral ideals, character, policies and relationships of people and corporations involved in technological activity. Moral standards /values and system of morals.

**5. What is meant by normative inquiry? (MAY/JUNE 2011)**

Engineering ethics involves normative inquiry in order to aim at identifying and justifying the morally desirable norms or standards that ought to guide individuals or groups. Normative questions include what ought to be? and what is good?

**6. What do you mean by ethical pluralism?(APRIL/MAY 2010)**

Ethical pluralism is the view that there may be alternative moral perspectives that are reasonable, but no one of which must be accepted completely by all rational and morally concerned persons.

**7. Differentiate Moral and Ethics? (MAY/JUNE 2010)**

Moral:

- o Refers only to personal behavior.
- o Refers to any aspect of human action.
- o Social conventions about right or wrong conduct.

Ethics:

- Involves defining, analyzing, evaluating and resolving moral problems and
- Developing moral criteria to guide human behavior.
- Critical reflection on what one does and why one does it.
- Refers only to professional behavior.

**8. State Rawls principles? (NOV/DEC2010)**

Each person is entitled to the most extensive amount of liberty compatible with an equal amount for others.

Differences in social power and economic benefits are justified only when they are likely to benefit everyone, including members of the most disadvantaged groups.

**9. Write any three uses of ethical theories. (NOV/DEC2010, MAY/JUNE 2014)**

Ethical theories are very useful in understanding and resolving moral dilemmas.

In estimating the professional obligations and ideals.

Determine to what extent, the obligations can be exercised in a given situation.

**10. What are the types of Theories about Morality/ Right action? (MAY/JUNE 2009)**

Virtue ethics – Virtues and vices

Utilitarianism – Most good for the most people

Duty ethics – Duties to respect people

Rights ethics – Human rights

**11. Explain Ethical Egoism (MAY/JUNE 2009)**

It deals with self-interest. Each person is the best judge of their own self-interest and is responsible for maximizing their own interest. Egoism preaches selfishness but morality should encourage love, compassion etc.

**12. Differentiate Ethical Relativism and Ethical Egoism? (MAY/JUNE2008)**

- Ethical egoism – the view that right action consist in producing one's own good.
- Ethical relativism – the view that right action is merely what the law and customs of one's society require.

**13. Explain moral integrity? (MAY/JUNE2008)**

Moral integrity is the strength of character on the basis of moral concern and moral values. Integrity is the bridge that links the responsibilities between personal life and professional carrier.

**14. Explain profession and professionalism? (NOV/DEC 2008)**

Profession is a job through which someone makes living.

Professionalism cover comprehensively all areas of practice of a particular profession. It requires skills and responsibilities involved in engineering profession.

**15. Give the importance of Lawrence Kohlberg's and Carol Gilligan's theory? (NOV/DEC 2008)**

Kohlberg gives greater emphasis to recognizing rights and abstract universal rules. Gilligan Stresses the importance of maintaining personal relationships based on mutual caring.

**16. What is consensus and controversy?**

Consensus means agreement and controversy means disagreement. Both plays the vital roles while considering moral autonomy.

**17. What is the relationship between moral autonomy and authority?**

Moral' autonomy is exercised on the basis of moral concern for other people and recognition of good moral reasons. Authority provides the frame work inwhich learning can takes place in class room/work place.

**18. What are the types of virtues?**

Self-direction – commitment, self-discipline, courage

Public spirited – justice, generosity.

Teamwork – cooperation, loyalty, respect for authority, leadership qualities.

Proficiency- technical skill, creativity.

**19. What are the cardinal virtues/ Chief Virtues?**

Wisdom - courage -temperament -justice

**20. What are the concepts of pre-conventional & conventional level in Gilligan's theory?**

Carol Gilligan recast the theory of Kohlberg as follows.

**Pre conventional level:** Desire to derive benefits for oneself. Right conduct is viewed in a selfish manner as solely what is good for oneself.

**Conventional level:** Here the basic motive is willingness to sacrifice one's own interests and a strong desire to hurt other's interests. Mostly women are always willing to give up their personal interests in order to serve the needs of others.

**21. Define Ethics. Mention some universally accepted ethical standards. (NOV/DEC 13)**

"Ethics" as the "discipline dealing with what is good and bad and with moral duty and obligation," "a set of moral principles or value" or "a theory or system of moral values." Ethics assists individuals in deciding when an act is moral or immoral, right or wrong. Ethics can be grounded in natural law, religious tenets, parental and family influence, educational experiences, life experiences, and cultural and societal expectations. Ethical Standard **such as Focus on ethics, Corporate culture, Managerial**

**22. Define moral values with suitable Example. (NOV/DEC 2013),(APR/MAY2015)**

Moral values are the standards of good and evil, which govern an individual's behavior and choices.

Individual's morals may derive from society and government, religion, or self-Honesty, respect for others, loyalty, responsibility for personal actions, generosity and kindness are all examples of moral values.

**23. What is meant by normative enquiry?(APRIL/MAY 2011)**

Normative ethics an approach to ethics that works from standards of right or good action. There are three types of normative theories: virtue theories, deontological theories, and teleological theories.

**24. Define "Professionalism". (APRIL/MAY 2015)**

Professionalism means behaving in an ethical manner while assuming and fulfilling your rightful responsibilities in every situation every time, without fail. To get a bit more granular, one can say that it means, in part, conducting your affairs in such a way as to engender trust and confidence in every aspect of your work.

**25. Define Moral Autonomy (NOV/DEC2014)**

**Moral autonomy**, usually traced back to Kant, is the capacity to deliberate and to give oneself the **moral law**, rather than merely heeding the injunctions of others. Personal **autonomy** is the capacity to decide for oneself and pursue a course of action in one's life, often regardless of any particular **moral content**.

**PART-B**

1. What are the stages of moral development according to Gilligan? Discuss

**(R)(8)(MAY/JUNE 2012, (MAY/JUNE 2014)**

2. Apply both Kohlberg's and Gilligan's theory in Heinz Dilemma and justify your arguments(8)(MAY/JUNE2011,MAY/JUNE2012, (MAY/JUNE 2014), (APR/MAY2015)(NOV/DEC 2014(Ap)

3. What are the uses of ethical theories explain? (16) (U)(MAY/JUNE 2012)

4. Explain

1. Professional responsibility (4)
2. Integrity and self-respect. (8)
3. Utilitarianism (4) (MAY/JUNE 2011) (U)

5. Explain Kohlberg's theory in detail?(12)(U)(MAY/JUNE2011) (APR/MAY2015)

6. What are the scopes of engineering ethics? (R)(16) (MAY/JUNE 2011)

7. What are the different ethical theories available for right action, self-interest, duty Ethics.(U) (16)(MAY/JUNE 2010, (NOV/DEC 2013), (APR/MAY2015)

8. Discuss the different models of professional roles?(16)(U) (MAY/JUNE 10)

9. Highlight the importance of engineering ethics? (16) (R)(MAY/JUNE 11)

10. What are the general types of inquiries involved in engineering inspection? Explain in detail the specific virtues of professional responsibility (U) (MAY/JUNE 2014, (NOV/DEC 2013), (APR/MAY2015) (NOV/DEC 2014)

11. Explain the vital role of consensus and controversy while considering moral autonomy in engineering ethics.(U) (MAY/JUNE 2014)

12. Write short notes on Moral autonomy(R) ( NOV/DEC 2013)

#### **COURSE OUTCOME:**

The students will understand the basic perception of profession, professional ethics, various moral issues & uses of ethical theories

#### **UNIT –III**

#### **ENGINEERING AS SOCIAL EXPERIMENTATION**

**SYLLABUS:** Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.

**COURSE OBJECTIVE:** To provide basic familiarity about Engineers as responsible Experimenters, Research Ethics, Codes of Ethics, Industrial Standards

#### **PART A**

**1. What are the pros and cons of industrial standardization? (MAY/JUNE 2012)**

- Accuracy in measurement, interchange ability, eases of handling.
- Prevention on of injury, death and loss of income or property.
- Fair value of price.
- Competence in carrying out tasks.
- Sound design, ease of communications.



**2. What are the limitations of ethical code? (MAY/JUNE 2011)(NOV/DEC 2014)**

Codes are restricted to general and vague wording. Codes can't give a solution or method for solving the internal conf Codes cannot serve as the final moral authority for professional conduct.

**3. Define ethical accountability?(MAY/JUNE 2011)**

The inherent tendency of accepting moral responsibility for the actions of an individual and also the spontaneous willingness to subject himself to the moral scrutiny in an open-minded manner is called ethical accountability.

**4. Name the aerospace experts and scientists who were associated with the Launching of challenger? (MAY/JUNE 2010)**

Allan McDonald of Morton-Thiokol at Cape Kennedy, Arnold Thomson and Roger Boisjoly who were the seal experts at Morton-Thiokol and engineering managers, Bob Lund and Joe Kilminster were the experts associated with the launching of challenger space program.

**5. Name some of the important code of ethics published by engineering societies. (MAY/JUNE 2010)**

National society of professional Engineers.  
Board of Ethical review.  
NSPE opinion of the Board of ethical review.  
American Association of Engineering societies(AAES).  
Institute of Electrical and Electronics Engineers (IEEE).

**6. What was the primary reason that caused the failure of space shuttle program "challenger" (NOV/DEC 2010)**

The consequent rupturing of O-ring that constitute the field joints due to extreme cold weather was the primary reason that resulted in the failure of challenger space shuttle.

**7. What are the problems with the law in engineering?(NOV/DEC 2010)**

- a. Minimal compliance
- b. Many laws are without enforce able sanctions.

**8. How engineering could be regarded as preventive technology?(MAY/JUNE 2009)**

As per the familiar proverb that "prevention is better than cure", the ultimate process of solving the scientific-based problems is not by curing alone, but effectively by the preventive measures. Such type of defensive measures to prevent scientific ills is called preventive technology.

**9. What are the general features of morally responsible engineers?(MAY/JUNE 2009)**

- a. Conscientiousness.
- b. Comprehensive perspective.
- c. Autonomy. d. Accountability.

**10. What is the specific role of informed consent in engineering experimentation?**

- Informed consent is the vital concept to interact engineers with public society.

- It reflects the respects for the fundamental rights of minority people involved in the experimental procedures.
- It enables both the public and clients to be aware of the practical risks and benefits of that experimentation.

### **11. What are the differences between engineering and standard experiments?**

Engineering experimentation involves human subjects as control groups, unlike in the standard experimentation. The process of obtaining the informed consent from the human-engineering experimentation. Unlike in the scientific experiments, new knowledge is not gained in engineering experiment.

### **12. Differentiate scientific experiments and engineering projects?**

Scientific experiments are conducted to gain new knowledge, while –engineering projects are experiments that are not necessarily designed to produce very much knowledge.

### **13. How Titanic tragedy be brought under engineering as social experimentation?**

Failure in the far-sighted approach of not providing enough number of lifeboat and non-availability of proper safe exits handled to the sinking of titanic ship that caused the death toll of 1522 persons on board. These in designing are the reasons for bringing titanic tragedy under engineering as social experimentation

### **14. Define the term moral autonomy.**

The moral beliefs and attitudes of an individual with a committed action towards the specific principles and goals is called moral autonomy.

### **15. What are the uncertainties occur in the model designs?**

- Model used for the design calculations.
- Exact characteristics of the materials purchased.
- Constancies of materials used for processing and fabrication.
- Nature of the pressure, the finished product will encounter.

### **16. What is meant by engineering as experimentation? (MAY/JUNE2014) (APR/MAY 2015)(NOV/DEC 2014)**

Experimentation (Preliminary tests or Simulations) plays a vital role in the design of a product or process.

In all stages of converting a new engineering concept into a design likes,

- first rough cut design,
- usage of different types of materials and processes,
- detailed design,
- further stages of work design

### **17. State the importance of Ethics codes. (MAY/JUNE2014)**

Engineers shall uphold and advance the integrity, honor, and dignity of the engineering

profession by:

- using their knowledge and skill for the enhancement of the human race;
- being honest and impartial and serving with fidelity the public, their employers, and clients.
- striving to increase the competence and prestige of the engineering profession.
- supporting the professional and technical societies of their discipline

**18. What are the senses of engineering ethics?(NOV/DEC 2013)**

An activity and area of inquiry.

- Ethical problems, issues and controversies.
- Ethical problems, issues and controversies. o Particular set of beliefs, attitudes and habits.
- Morally correct.

**19. Define Engineering Ethics.(NOV/DEC 2013)**

- Study of the moral issues and decisions confronting individuals and organizations Engaged in engineering / profession.
- Study of related questions about the moral ideals, character, policies and relationships
- Of people and corporations involved in technological activity.
- Moral standards / values and system of morals

**20. List the advantages of industrial standards.(APR/MAY 2015)**

- o Increased marketability
- o Reduced operational expenses
- o Better management control
- o Increased customer satisfaction
- o Improved internal communication

**PART-B**

1. What is meant by professional responsibility and discuss the theories about virtues? **(MAY/JUNE2012)(R)**
2. Explain a Balanced Outlook on Law **(NOV/DEC2010)(U)**
3. Discuss the theories pertaining to moral autonomy with specific reference to consensus and controversy?**(MAY/JUNE 2011)(U)**
4. Where and how do moral problems arise in engineering?**(An) (MAY/JUNE2009)**
5. Discuss on the different roles played in the code of ethics set by professional societies? **(U, MAY/JUNE 2012,MAY/JUNE2011,NOV/DEC 2013)(NOV/DEC2014)**
6. Give justification on how the challenger disaster could have been avoided by engineers? **(NOV/DEC 2011/MAY/JUNE 2012)(An)**
7. How engineering project differ from standard experimentation? **(U)(NOV/DEC 2013)**

8. Discuss on the different roles played in the code of ethics set by professional societies? **(NOV/DEC 2013)(U)**
9. Explain Engineers as responsible Experimenters.(U) **(NOV/DEC 2012)**
10. Briefly discuss the space shuttle challenger accident. What is the ethical problem involved in this? **(MAY/JUNE 2014) (NOV/DEC 2014)(An)**
11. Discuss about Research ethics. ?(U) **(MAY/JUNE 2014) (NOV/DEC 2014)**
12. What is meant by informal consent when bringing an experimental product to the market? **(An, MAY/JUNE 2014)**
13. How the ethical codes provide discipline among the engineers?(An) **(MAY/JUNE2014), (APR/MAY2015) (NOV/DEC 2014)**
14. Explain the work ethics in detail. (U) **(NOV/DEC 2013)**
15. Whom do you think should take public accountability 'for unsafe machine? From the Designer to the final promoter, identify the roles and responsibilities towards safety and justify your views through a detailed case study. **(E)(APRIL/MAY 2012)**
16. Discuss briefly the role of industrial standards.(U) **(APRIL/MAY 2015)**
17. Discuss the ethical issues involved in challenger case study (U) **(APRIL/MAY 2015)**
18. Compare and contrast engineering experiments with standard experiments.(An) **(NOV/DEC2014)**

#### **COURSE OUTCOME:**

The students will understand various social issues, industrial standards, code of ethics and role of professional ethics in engineering field.

#### **UNIT-IV**

#### **SAFETY, RESPONSIBILITIES AND RIGHTS**

**SYLLABUS:** Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination.

**COURSE OBJECTIVE:** To inculcate knowledge and exposure on Safety and Risk, Risk Benefit Analysis and have an idea about the Collective Bargaining, Confidentiality, Professional, Employee, Intellectual Property Rights

#### **PART A**

#### **1. What is conflict Interest?( MAY/JUNE 2012)**

Types of Conflicts of interest

Actual conflict of interest

Potential conflict of interest

Apparent conflict of interest

Interest in other companies

Moonlighting

Insider information

**2. What are the reasons for Risk-Benefit Analysis? (NOV/DEC 2011, NOV/DEC 2013))**

- i. Risk-benefit analysis is concerned with the advisability of undertaking a project.
- ii. It helps in deciding which design has greater advantages.
- iii. It assists the engineers to identify a particular designs cores higher with that of the another one.

**3. What are the safety measures an engineer must know before assessing a risk of any product?(MAY/JUNE 2009)**

The factors are:

- a. Does the engineer have the right data?
- b. Is he satisfied with the present design?
- c. How does he test the safety of a product?
- d. How does he measure and weight he risks with benefits for a product.

**4. Explain the two types of Risk?( (MAY/JUNE 2012)**

i. Personal Risk:

An individual, who is given sufficient information, will be in a position to Decide whether to take part in a risky activity or not . They are more ready to take on voluntary risks than in voluntary risks.

ii. Public Risks:

Risks and benefits to the public are more easily determined than to individuals, as larger number of people is taken in to account .Involuntary risks are found here.

**5. Give the reasons for the Three Mile Island disaster?**

- i. In adequate training to the operators.
- ii. Use of B&W reactors.

**6. Define “risk”.(May/June 2011)(NOV/DEC2014)**

A risk is the potential that something unwanted and harmful may occur. $Risk = Probability \times Consequences.$

**7. What do you mean by voluntary risk? (May/June 2010, May/June 2010)**

If a person knowingly takes any risk, then he feels it safe. In contrast, if the same risk is forced to him, then he feels it unsafe.

In simple terms the voluntary risks are considered as safe and the involuntary risks are considered as unsafe.

**8. What is safe risk and acceptability of risk? (IT Dec 2009,May 2010)**

**Acceptability of risk:**

A risk is acceptable when those affected are generally no longer apprehensive about it. Apprehensiveness mainly depends on how the risk is perceived by the people.

**Safe Risk:**

If a person knowingly takes any risk then he feels it safe. In the same way voluntary risks are considered as safe risk

**9. List the methods that can be applied when testing is inappropriate.**

(May/june 2009 )(NOV/DEC2014)

- Scenario Analysis
- Failure modes and effects analysis
- Fault free analysis
- Event free analysis

**10. What is the use of knowledge of risk acceptance to engineers?**

Though past experience and historical data give better information about safety of products designing there are still inadequate .The reasons are

- a. The information is not freely shared among industries
- b. There also new applications of old technologies that provides available data, which are less useful.
- c. So, in order to access the risk of a product, the engineers must share their knowledge and information with others in a free manner.

**11. What are the positive uncertainties in determining risks?**

- a. Purpose of designing
- b. Application of the product
- c. Materials and the skill used for producing the product

**12. What is the Risk Transfer?**

It refers to the legal assignment of the cost of certain potential losses from one party to another. The most common way of affecting such transfer is by insurance.

**13. What are the steps involved in design for safety?**

1. Define the problem
2. Generate alternate solutions
3. Analyses each solution
4. Test the solution
5. Select the best solution
6. Implement the chosen solution.

**14. State the industrial definition on safety .(MAY/JUNE 2014)**

- A ship in harbor is safe, but that is not what ships are built for|| – John A. Shedd
- ‘\_A thing is safe if its risks are judged to be acceptable’ - William W. Lawrence
- We buy an ill-designed Iron box in a sale-> Underestimating risk
- We judge fluoride in water can kill lots of people -> Overestimating risk
- We hire a taxi, without thinking about its safety -> Not estimating risk

**15. What is meant by Disaster? (MAY/JUNE 2014, NOV/DEC 2013))**

**A DISASTER = A seriously disruptive event + A state of unprepared ness.**

e.g., Titanic collision with an iceberg, at night: Emergency

Fewer lifeboats, inadequate training and warnings of icebergs unheeded ->Disaster

**16. What is informed consent? (MAY/JUNE 2011)(APR/MAY 2015)**

Informed consent is the process by which the treating health care provider discloses appropriate information to a competent patient so that the patient may make a voluntary choice to accept or refuse treatment. It originates from the legal and ethical right the patient has to direct what happens to her body and from the ethical duty of the physician to involve the patient in her health care.

**17. What is the use of risk analysis? (APR/MAY 2015)**

Risk analysis is the process of defining and analyzing the dangers to individuals, businesses and government agencies posed by potential natural and human-caused adverse events.

**18. What is collegiality?( May/June 2011, Nov/June 2009, NOV/DEC 2014),(APR/MAY2015)**

Collegiality is a kind of connectedness grounded in respect for professional expertise and in a commitment to the goals and values of the profession and collegiality includes a disposition to support and cooperate with one's colleagues.

**19. What are the elements of collegiality? ( May/June 2010, NOV/DEC 2014)**

- Respect
- Commitment
- Connectedness
- Cooperation

**20. What do you meant by employee rights and lists its categories? (Nov/Dec 2012)**

Employee rights are rights, moral or legal, that involve the status of being an employee. They include some professional rights that apply to the employer-employee relationship.

**21. What is the Basic Right of Professional Conscience? (MAY/JUNE 2011)**

The right to do what everyone agrees it is obligatory for the professional engineers to do the basic professional right is an entitlement giving one the moral authority to act without interference from others.

**22. What is Institutional Recognition of Rights? (NOV/DEC 2011)**

One should have moral right, having it respected by others and given Recognition with in the institution is the other. Koning states in 1975, conference on Engineering Ethics- that one item that should be in the code of ethics is that engineers have the right at all times to exercise the dictates of their own conscience.

**23. State the specific right.**

Specific rights can be stated as a particular professional obligation to apply Professional rights according to specific circumstances.

**24. What are the two basic rights of professional/conscience**

First is to proceed piecemeal by reiterating the justification given for the specific professional duties Second, is to justify the right of professional conscience, which involves grounding it more directly in the ethical theories, for organizing moral reflections and approaching practical problems.

**25. What is Duty Ethics? (May/June 2011)**

Duty ethics rights are not the ultimate moral appeal . Engineers have a right to do something it is only because other have duties or obligations to allow him to do it . No employer has the right to threaten engineers with loss of the jobs for refusing to work on project they see as likely to lead to the death or injury of unsuspecting victims.

**26. What is Utilitarianism?**

Utilitarianism will justify the right of professional conscience by referring to the Basic goal of producing the most good for the greatest number of people the public good is certain to observed by allowing professionals to meet their obligations to the public.

**27. What is meant by collective Bargaining?(May/June 2014)**

**Collective bargaining** is a process of negotiations between employers and a group of employees aimed at reaching agreements to regulate working conditions. The interests of the employees are commonly presented by representatives of a to which the employees belong. The collective agreements reached by these negotiations usually set out wage scales, working hours, training, health and safety, overtime, grievance mechanisms, and rights to participate in workplace or company affairs

**28. What is meant by Occupational crime? (May/June 2014)****Occupational Crime**

Occupational crimes are illegal acts made possible through one's lawful employment. It is the secretive violation of laws regulating work activities. When committed by office workers or professionals, occupational crime is called \_white collar crime\_.

**29. List the factors that shape the self confidence in a person. (NOV/DEC 2013),(APR/MAY2015)**

- Emphasize Strengths
- Take Risks.
- Use Self-Talk.
- Self-Evaluate.

**30. Difference between Bribe and Gift. (NOV/DEC 2014)**

**Gift:** Something of value given without the expectation of return

**Bribe:** Something of value given with the hope of a future influence or benefit

**PART-B**

1. Discuss the notion of safe exit using evacuation plans for communities near power plants or Chemical processing plants? (U) (May/June 2010) (MAY/JUNE 2014)
2. What is risk-benefit analysis? Explain the different analytical method used when testing is inappropriate ? (U) (Nov/Dec 2010, May/June2011) (NOV/DEC 2014)
3. State the necessity of risk benefit analysis (R)(MAY/JUNE 2014)
4. Discuss the Bhopal disaster .Explain the responsibility of engineer in the design stage itself before the event of an accident. (U) MAY/JUNE 2014)(APR/MAY 2015)
5. Define the term risk and safety .How will an engineer assess the safety? (An)(NOV/DEC 2014)



6. What are the factors that affect risk acceptability? What is the use of knowledge of risk acceptance to engineers? (U) (NOV/DEC 2013)
7. a) Describe the concept of (16) (R) (Apr/May 2015)
- 1) Risk benefits analysis.
  - 2) Fault tree analysis.
8. Explain in detail the effect of information on risk assessment with an example (U) (NOV/DEC 2014)
9. Discuss the concept of safety exists in the Chernobyl Case Studies(U)(NOV/DEC 2014)
10. Write short notes on
- (i) Whistle blowing
  - (ii) Occupational crime
  - (iii) Intellectual property rights
  - (iv) Discrimination
  - (V) Institution Authority (R, APRIL/ MAY 2013,NOV/DEC 2013)( APRIL/ MAY 2015)
11. Name and describe four important responsibilities of engineers as employees.(U)(NOV/DEC 2011)
12. Write a detailed note about the employee rights and professional rights that the engineers are entitled. (APRIL/ MAY 2010), (NOV/DEC 2013) ,(APRIL/ MAY 2015)(R)
13. Discuss about Collegiality and Loyalty(U)(MAY/JUNE 2014) (NOV/DEC 2014)
- 14.What are the main element of IPR ?Give example of discrimination(MAY/JUNE 2014)(R)
- 15.Discuss human rights,professional rights and employee rights in an engineer field.(U) (MAY/JUNE 2014)
16. Discuss the significance of intellectual property rights.Also explain the legislations covering intellectual property rights in india.(NOV/DEC 2013) (NOV/DEC 2014)(U)
17. Discuss the significance of loyalty and collegiality in team work? (APRIL/ MAY 2015)(U)

**COURSE OUTCOME:**

The students will be aware of responsibilities of an engineer for safety and risk benefit analysis, professional rights and responsibilities of an engineer.

**UNIT V**  
**GLOBAL ISSUES**

**SYLLABUS :** Multinational Corporations – Business Ethics - Environmental Ethics – Computer Ethics - Role in Technological Development – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Honesty – Moral Leadership – Sample Code of Conduct.

**COURSE OBJECTIVE:** To have an adequate knowledge about MNC's, Business, Environmental, Computer Ethics, Honesty, Moral Leadership, sample Code of Conduct.

### **PART A**

**1. What is embezzlement? (APRIL/ MAY 2011)**

The process of computing computer crimes such as stealing or cheating clients and conspiracy in the fraudulent uses of computer networks is called embezzlement.

**2. What the hired guns? (APRIL/ MAY 2011)**

Engineers are hired by attorneys to help them to establish the facts in away favorable to their clients. The hired guns violate the standards of honesty and also due care in conducting investigations.

**3. What is technology transfer? (APRIL/ MAY 2010)**

Technology transfer is a process of changing the technology to a new setting and implementing it. Technology includes hardware such as machines and installations as well as techniques such as technical, organizational and managerial skills and procedures.

**4. What does moral leadership mean?(APRIL/MAY2010) (NOV/DEC 2014)**

Whenever the goals of a leader become permissible and also morally valuable, it is known as moral leadership. Moral leadership also means that employing morally acceptable ways to motivate the groups to move towards morally desirable ways. The ways are depending on the situations.

**5. State the most important ethical mistake made by the multinational corporation which caused Bhopal gas plant disaster. (NOV/DEC 2010)**

- o The tanks used to store Methyl Iso-cyanate were overloaded to a tune of 75%.
- o The emergency plant was also filled with a large amount of chemicals.
- o The entire refrigeration unit had been shut down as a measure to reduce the cost and this led to increase of temperatures to a higher level.
- o One of the disappointed workers unscrewed a pressure gauge on a tank and inserted a hosepipe into it, knowing that it would cause damage, but not to this extent.
- o Scrubber has also been shut down.
- o Flare tower was also not in an operating condition.
- o Unfortunately there were no emergency drills or evacuation plants available.

**6. Define Conflict resolution. (APRIL/ MAY 2010)**

Conflict resolution is the result based on some objective standard and corporate usually uses general standards for evaluating the results.

**7. What is contextualize? (APRIL/MAY 2010)**

In accordance to Gilligan women try hard to preserve personal relationship will all people. This context-oriented emphasis on maintaining personal relationship is called as ethics of care in contrast with ethics of rules and rights.

**8. What are ethical pluralism and ethical relativism? (APRIL/MAY 2010)**

Ethical pluralism: According to this view there may be alternative moral perspectives that are reasonable, but no one of which must be accepted completely by all rational and morally concerned persons.

Ethical relativism:

Actions are morally right when they are approved by law or custom they are wrong when they violate laws or customers.

**9. What should an ethical expert witness, even though hired by a company, expected to do? (APRIL/MAY 2010)**

Engineers should not become the hired-guns to their clients, but instead remain as objective as humanly possible in their investigations and the conclusions they reach .they should avoid biases resulting from money ego, and sympathy.

**10. What are the international rights listed by Donaldson? (NOV/DEC 2014)**

Thomas Donaldson in his book ‘\_The ethics of International Business’ has listed the following as the International rights:

- The right to freedom of physical movement
- The right to ownership of property
- The right to freedom from torture
- The right to a fair trial
- The right to nondiscriminatory treatment
- The right to physical security
- The right to freedom of speech and association
- The right to minimal education
- The right to political participation
- The right to subsistence.

**11. Define appropriate technology? (IT Nov 2008)**

Appropriate technology refers to the identification, transfer and implementation of the most suitable technology for a new set of conditions.

**12. List out four examples for Multinational Corporation. (IT Nov 2010)**

Large corporations having investment and business in number of countries are known as Multinational or Transnational corporation. Some of them are : Hindustan Lever, Ford, Toyota, Sony, LG, Smith Kline Beecham, ITC, Ponds etc.

**13. Define computer ethics?(DEC/NOV2010)**

Computers contribute to a variety of moral problems. In order to evaluate and act appropriately with such problems, a new field of applied ethics termed as ‘\_computer ethics’ has been developed.

The study of ethical issues that are associated with computer, its peripheral and access series and the computing profession is called as computer ethics.

**14. What is meant by globalization?**

Our lives are increasingly dependent upon the goods/services produced over the world and are

influenced by the business from around all the corners of the world. In general world has become a global village and have a global economy. The increasing international flow of capital, technology, trade, and people have had the effects of changing the nature of local organizations governments and people of countries and have led to social changes and developments.

**15. What are the three senses of relative values? (DEC/ NOV 2012)**

- Ethical Relativism
- Descriptive Relativism
- Moral Relativism

**16. What are the normal issues arise in Multinational Corporation?(MAY/JUNE 2014)**

Ethical dilemmas faced by certain companies may be specific to their industry or company, other types of ethical issues are common to all types of companies. Handling ethical decisions with wisdom is especially important for small businesses, given the potentially devastating effects these companies may face if such issues aren't handled correctly.

**17. Differentiate the Eye witness and expert witness in the legal system (MAY/JUNE 2014)**

An eyewitness is one who testifies what they perceived through his or her senses (e.g. seeing, hearing, smelling, touching). That perception might be either with the unaided human sense or with the aid of an instrument, e.g., microscope or stethoscope, or by other scientific means, e.g.a chemical reagent which changes color in the presence of a particular substance

An expert witness is one who allegedly has specialized knowledge relevant to the matter of interest, which knowledge purportedly helps to either make sense of other evidence, including other testimony, documentary evidence or physical evidence (e.g., a fingerprint)

**18. What is meant by Moral Leadership (NOV/DEC 2013)**

**Moral Leadership** is a very different kind of **leadership**. Rather than aspiring to being followed, **Moral Leaders** aim to serve. Instead of showcasing their own skills, **Moral Leaders** tend to develop the capacities of others.

**19. Define the term „honesty“ and „moral leadership“**

**Honesty** :A facet of moral character that connotes positive and virtuous attributes such as integrity, truthfulness, and straightforwardness, along with the absence of lying, cheating, or theft

**„Moral Leadership“**: A process of social influence in which one person enlists the aid and support of others in accomplishing a common task.

**20. What do you understand by „business ethics“?**

**Business ethics** (also corporate **ethics**) is a form of applied **ethics** or professional **ethics** that examines **ethical** principles and moral or **ethical** problems that arise in a **business** environment. It applies to all aspects of **business** conduct and is relevant to the conduct of individuals and entire organizations.

**PART B**

1. Explain in detail the issues pertaining to environment issues? (R) (APRIL/ MAY 2011)
2. Describe the Bhopal Gas Tragedy and its effects?(R)(APRIL/MAY 11)

3. Is there any relationship among engineering ecology and economics? discuss.(An)(NOV/DEC 2012)
4. Write briefly on(R)
  - (i) Engineer used as expert witness.
  - (ii) Engineers as good managers.
  - (iii) Engineers with social responsibilities.(MAY/JUNE 2013)
5. Discuss the following in detail(MAY/JUNE 2014)(U)
  - Business Ethics
  - Environmental Ethics
  - Computer Ethics
  - Weapons Development(NOV/DEC 2013)
6. What is environment ethics?Why it is important to study. Discuss any environment issues in the ethical point of view to engineers. (NOV/DEC 2013),(APR/MAY 2015) (NOV/DEC 2014)(An)
7. Discuss the following in detail (MAY/JUNE 2014)(U)
  - Engineers as Managers
  - Engineers as advisors
  - Engineers as consultant
  - Moral leadership
8. Discuss the various global issues that have an impact on business.(U)(APR/MAY2015)
9. Discuss the ethical issues related to computer ethics and internet (U)(NOV/DEC2014)

**COURSE OUTCOME:**

The students will acquire knowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives

**COURSE OUTCOMES****Course Name : PROFESSIONAL ETHICS IN ENGINEERING (GE6075)****Year/Semester : IV / VIII****Year of Study : 2016–2017 (R – 2013)****On Completion of this course student will be able to**

<b>C410.1</b>	Understand the core values that shape the ethical behavior of an engineer and Exposed awareness on professional ethics and human values.
<b>C410.2</b>	understand the basic perception of profession, professional ethics, various moral issues & uses of ethical theories
<b>C410.3</b>	understand various social issues, industrial standards, code of ethics and role of professional ethics in engineering field
<b>C410.4</b>	Aware of responsibilities of an engineer for safety and risk benefit analysis, professional rights and responsibilities of an engineer.
<b>C410.5</b>	acquire knowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives

**CO – PO MATRIX:**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>C410.1</b>	-	-	-	-	-	1	1	3	1	2	-	-
<b>C410.2</b>	-	-	-	-	-	1	1	3	1	2	-	-
<b>C410.3</b>	-	-	-	-	-	3	2	3	-	1	-	-
<b>C410.4</b>	-	-	-	-	-	3	2	1	-	-	-	-
<b>C410.5</b>	-	-	-	-	-	3	2	2	-	1	3	-
<b>AVG</b>	-	-	-	-	-	2.2	1.6	2.4	1	1.5	3	-

**COURSE OUTCOMES AND PROGRAM SPECIFIC OUTCOMES MAPPING****CO – PSO MATRIX:**

CO	PSO1	PSO2	PSO3
<b>C410.1</b>	-	-	1
<b>C410.2</b>	-	-	-
<b>C410.3</b>	-	-	-
<b>C410.4</b>	-	-	1
<b>C410.5</b>	-	-	1
<b>AVG</b>	-	-	1