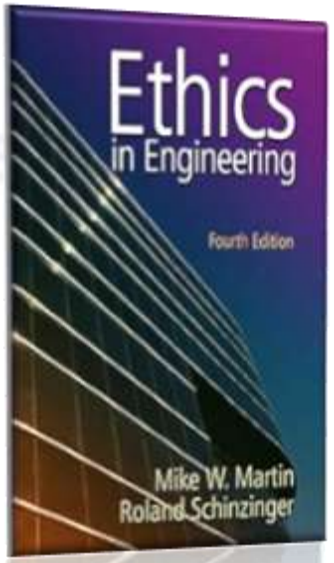
Engineering Ethics (HSS-422) (3+0)



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Engineering Ethics (HSS-422) (3+0)

IMPEDIMENTS TO RESPONSIBLE

Week No 03

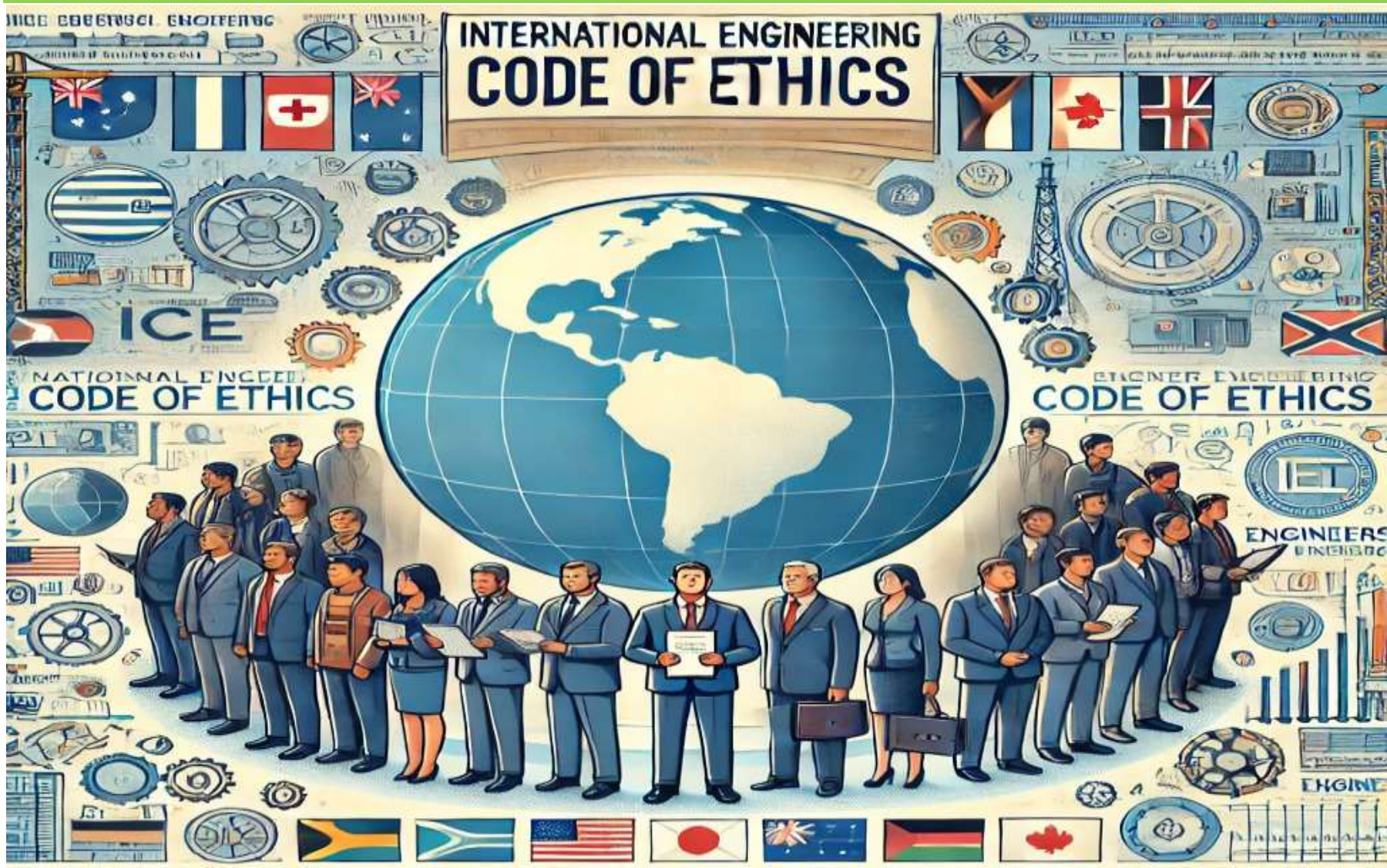
By Engr. Syed Rizwan Ali

Learning Outcomes

In this Lecture will cover ..

- Understand the Impact of Action Self-Interest on Ethical Decision-Making.
- Recognize and Mitigate Self-Deception in Professional Practice.
- Evaluate the Role of Fear in Ethical Compliance and Integrity.
- Acknowledge and Overcome Ignorance and Egocentric Tendencies in Engineering.
- Critically Assess the Influence of Authority.

INTERNATIONAL ENGINEERING CODE ETHICS



International Engineering Code Ethics

❖ **Professional Organizations:**

- National Society of Professional Engineers (NSPE) Code of Ethics (USA): Provides guidelines for professional conduct to ensure public safety, health, and welfare.

- Institution of Civil Engineers (ICE) Code of Professional Conduct (UK): Outlines the standards of professional conduct and ethical behavior for civil engineers.

International Engineering Code Ethics

❖ **Professional Organizations:**

- Engineers Australia Code of Ethics: Sets out the principles and values that guide the professional conduct of engineers in Australia.

- Canadian Engineering Qualifications Board (Engineers Canada) Code of Ethics: Provides ethical guidelines for engineers in Canada, emphasizing public safety and responsibility.

International Engineering Code Ethics

❖ **Professional Organizations:**

- Institution of Engineers India (IEI) Code of Ethics: Defines the ethical standards for engineers in India, focusing on honesty, integrity, and fairness.

- The Institution of Engineering and Technology (IET) Code of Conduct (UK): Provides a framework for ethical decision-making and professionalism in engineering.

International Engineering Code Ethics

❖ **Professional Organizations:**

- Engineers Ireland Code of Ethics: Lays down the ethical and professional standards expected of engineers in Ireland.

- Japan Society of Civil Engineers (JSCE) Code of Ethics: Establishes ethical standards for civil engineers in Japan, focusing on public welfare and environmental protection.

International Engineering Code Ethics

❖ **Professional Organizations:**

- Engineers New Zealand Code of Ethical Conduct: Sets out the ethical obligations of engineers in New Zealand, emphasizing professionalism and public interest.

- South African Institution of Civil Engineering (SAICE) Code of Ethics: Provides ethical guidelines for civil engineers in South Africa, promoting integrity and public trust.

International Engineering Code Ethics

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Introduction to Engineering Ethic

Introduction to Engineering Ethic

❖ **Key Terms:**

- **Ethics:** Refers to the field of applied ethics that examines the moral issues and standards of conduct in the engineering profession.

- It involves adhering to principles like honesty, integrity, transparency, and responsibility, guiding engineers in their professional behavior and decision-making processes.

Introduction to Engineering Ethic

❖ **Importance:**

- **Ethics:** In software engineering is paramount due to the significant impact software has on society, economies, and individual lives.
- Ethical considerations in software engineering ensure that technology is developed and used in a way that is safe, fair, and respects the rights and dignity of all individuals.
- This includes ensuring the privacy and security of user data, avoiding conflicts of interest, - Continue

Introduction to Engineering Ethic

- **Importance:**
- **Ethics:**
- Delivering products that meet safety standards, and making decisions that consider the welfare of the public and the environment.

- Ethical practices in software engineering also help in building trust with users and maintaining the profession's reputation.

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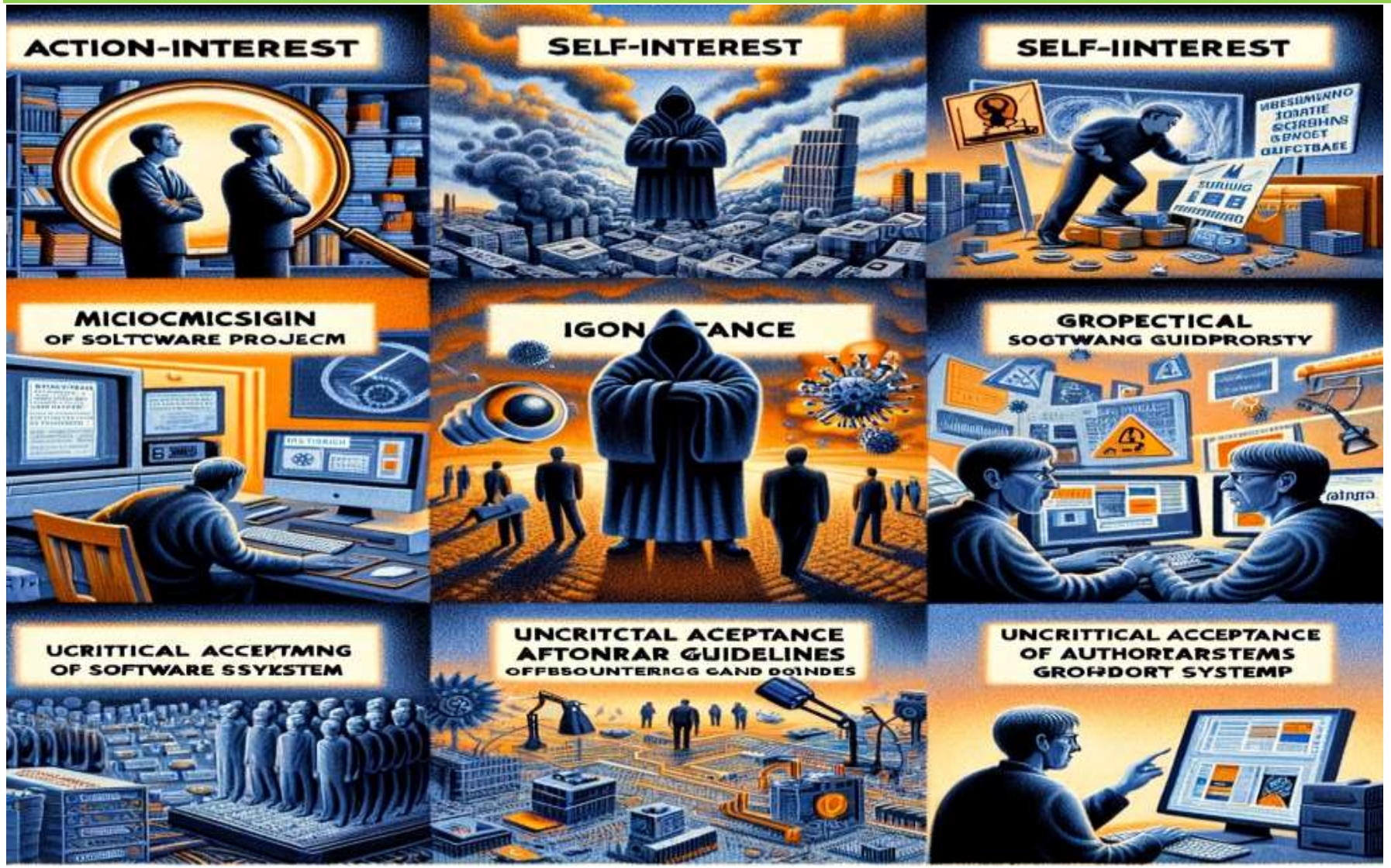
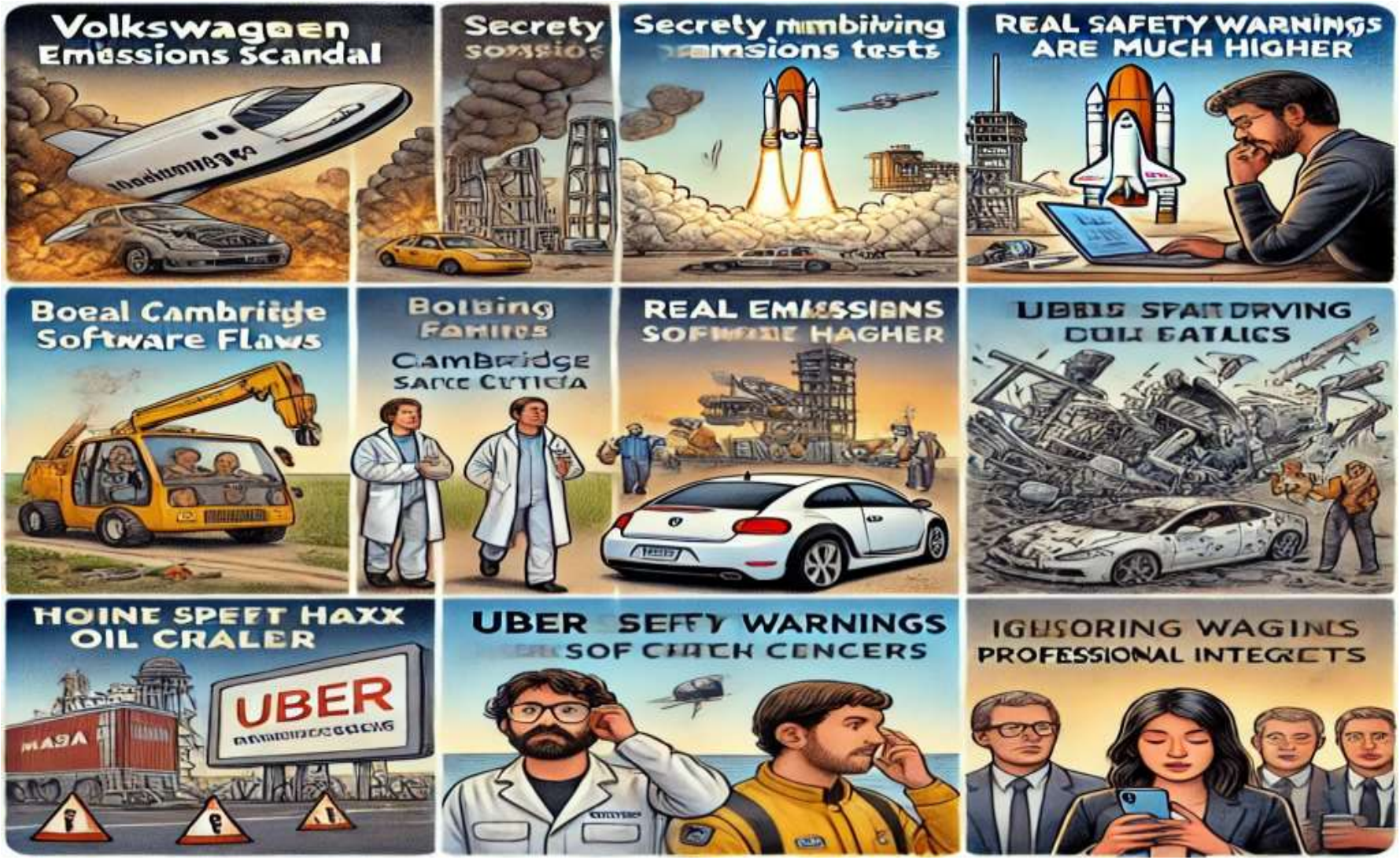


IMPEDIMENTS TO RESPONSIBLE



Impediments To Responsible

Background:

- The various obstacles engineers face when making ethical decisions and how these challenges impact their professional integrity. The key topics covered include:

1- Self-Interest	**7- Uncritical Acceptance**
2- Self-Deception	**8- Groupthink**
3- Fear and Its Influence on Ethics	**9- Strategies to Overcome Ethical Challenges**
4- Ignorance in Engineering Ethics	
5- Ethics Egocentric Tendencies	
6-Tendencies Microscopic Vision In Ethics	

Self-Interest

❖ **Background:**

- It refers to the behavior where an individual prioritizes personal benefits or gains over the collective good or ethical standards.

- This behavior is often driven by personal motivations, such as financial gain, career advancement, or recognition, at the expense of broader ethical considerations.

Self-Interest

❖ **Example:**

- In the context of software engineering, a clear instance of action self-interest occurs when they prioritizes personal gains over ethical practices.
- For instance, a software engineer might push for the release of a software product despite knowing it contains critical bugs.
- This action could be motivated by the desire to meet project deadlines, achieve performance targets, or secure bonuses, even though it compromises the quality of the product and could potentially harm users or stakeholders.

Self-Interest: Real World Case

Self-Interest: Real World Case

- **Case: Volkswagen Emissions Scandal (2015):**
- **Issue:** Volkswagen engineers programmed diesel engines to cheat emissions tests. The company marketed cars as environmentally friendly when they emitted far more pollutants than allowed.
- **Ethical Violation:** Engineers prioritized corporate profits and job security over environmental and public health.
- **Impact:** The scandal led to billions in fines, loss of trust, and reputational damage to Volkswagen.

Self-Deception

❖ **Background:**

- is the act of misleading oneself to believe something is true when it is not, often to avoid facing uncomfortable facts or realities.

- It involves a lack of self-awareness or denial of one's own motivations, feelings, or beliefs, which can lead to a distortion of reality and ethical judgment.

Self-deception

❖ **Example:**

- In the context of software engineering, self-deception can occur when a developer overestimates the efficiency of their code and ignores the constructive criticism or concerns raised during peer reviews.
- This denial of potential flaws and overconfidence in one's own abilities can lead to overlooking critical issues, resulting in project failures, software bugs, or security vulnerabilities that could have been addressed earlier with a more objective and open-minded approach to feedback and self-assessment.

Self-Deception: Real World Case

Self-deception: Real World Case

- **Case: Boeing 737 MAX Crashes (2018-2019)**
- **Issue:** Boeing engineers overlooked critical safety issues in the Maneuvering Characteristics Augmentation System (MCAS) and convinced themselves that existing pilot training was sufficient.
- **Ethical Violation:** Boeing engineers and executives ignored internal warnings, assuming safety systems would compensate for design flaws.

Self-deception: Real World Case

- **Case: Boeing 737 MAX Crashes (2018-2019)**
- **Impact:** Two fatal crashes (Lion Air Flight 610 and Ethiopian Airlines Flight 302) killed 346 people. Boeing faced lawsuits, grounding of the 737 MAX, and a loss of credibility.

Fear in Ethics Context

❖ **Background:**

- It refers to the emotional response or apprehension about facing negative consequences, which can influence an individual's decision-making process, leading them to act against their ethical principles.
- Fear can stem from various sources, such as the threat of job loss, reputational damage, legal repercussions, or personal harm, and can significantly impact an individual's ability to make morally sound decisions.

Fear in Ethics Context

❖ **Example:**

- In the realm of software engineering, fear can manifest as the apprehension of losing one's job, which might lead an engineer to compromise on ethical standards.
- For instance, an engineer might discover security vulnerabilities in a software product but choose not to report them due to fear of causing project delays, attracting blame, or even risking their employment.

Fear in Ethics Context

❖ **Example:**

- This fear-driven decision not only compromises ethical standards but also poses significant risks to users and stakeholders who rely on the software's integrity and security.

Fear in Ethics Context: Real World Example

Fear in Ethics Context: Real World Example

- **Case: Challenger Space Shuttle Disaster (1986)**
- **Issue:** Engineers at NASA and Morton Thiokol identified flaws in O-rings that could fail in cold temperatures but feared speaking up due to corporate and managerial pressure.
- **Ethical Violation:** The fear of delaying the launch and disappointing superiors led to the decision to proceed.
- **Impact:** The Challenger exploded shortly after takeoff, killing all seven crew members. It remains a case study on the importance of ethical decision-making in engineering.

Ignorance In Engineering Ethics

❖ **Background:**

- The lack of knowledge, understanding, or awareness of ethical standards, principles, and the potential consequences of one's actions in the engineering domain.

- It involves failing to recognize the ethical dimensions of engineering decisions and the impact these decisions can have on society, the environment, and individuals.

Ignorance In Engineering Ethics

❖ **Example:**

- In software development, ignorance can be seen when developers or engineers overlook or fail to consider the ethical implications of data privacy and security.
- For instance, if a team develops a new application without adequately addressing data protection measures, they may inadvertently expose user data to risks of theft, misuse, or breach.

Ignorance In Engineering Ethics

❖ **Example:**

- This lack of attention to the ethical importance of safeguarding user information not only undermines the trust in the product but also contravenes principles of confidentiality and non-maleficence in engineering ethics.

Ignorance In Engineering Ethics: Real World Case

Ignorance In Engineering Ethics: Real World Case

- **Case: Facebook-Cambridge Analytica Data Scandal (2018)**
- Issue: Facebook allowed third-party apps to access vast amounts of user data without consent. This data was used to manipulate elections and influence public opinion.
- Ethical Violation: Engineers and executives failed to recognize or address the ethical implications of their data-sharing policies.
- Impact: Facebook faced regulatory scrutiny, a $5 billion fine from the FTC, and damage to public trust.

Egocentric Tendencies

- **Background:**
- It is a pattern of thinking and behavior where an individual prioritizes their own perspective, interests, and needs over others, often leading to a lack of empathy and consideration for different viewpoints. In an ethical context, egocentric tendencies can lead to decision-making that overlooks the welfare of others, biases in judgment, and ethical lapses due to the inability to see beyond one's own interests and beliefs.

Egocentric Tendencies

❖ **Example:**

- In the context of a software development team, egocentric tendencies might manifest in a team leader who disregards the input and contributions of team members, believing that only their ideas are valid and superior.
- This attitude can result in ethical oversights, such as failing to address potential risks or ethical concerns raised by team members, leading to Decisions that might harm the project's stakeholders or end-users.

Egocentric Tendencies

❖ **Example:**

- Such behavior not only undermines team collaboration and morale but also risks compromising the ethical integrity of the project outcomes.

Egocentric Tendencies

Egocentric Tendencies

❖ **Case: Uber's Self-Driving Car Fatality (2018)**

- **Issue:** Uber's self-driving car project disregarded safety concerns raised by team members about inadequate pedestrian detection.
- **Ethical Violation:** Uber executives prioritized speed over safety, dismissing concerns from engineers.
- **Impact:** A self-driving Uber struck and killed a pedestrian in Arizona. Uber halted testing and faced lawsuits.

Microscopic Vision In Ethics

❖ **Background:**

- It refers to the tendency to focus narrowly on small or immediate details, tasks, or issues, while neglecting the larger, more significant ethical implications and consequences of one's actions or decisions.
- This perspective can lead to a lack of awareness or understanding of the broader ethical context and can result in decisions that are ethically shortsighted or detrimental.

Microscopic Vision In Ethics

❖ **Example:**

- It occur when developers or engineers concentrate exclusively on the technical aspects of a project, such as code optimization or feature development, without considering the broader ethical implications of the software product.
- They might focus on developing advanced data analytics capabilities without adequately addressing how this feature could – Continue

Microscopic Vision In Ethics

❖ **Example:**

- They might focus on developing advanced data analytics capabilities without adequately addressing how this feature could infringe on user privacy or be misused for surveillance or data exploitation.
- This narrow focus can lead to the creation of products that, while technically advanced, may cause harm, violate ethical norms, or have negative societal impacts.

Microscopic Vision In Ethics

Microscopic Vision In Ethics: Real World Case

- **Case: Theranos Blood Testing Fraud (2003-2018)**
- **Issue:** Theranos, a biotech startup, claimed its device could run multiple tests from a single drop of blood. Engineers focused on making the technology work while ignoring the broader ethical implications of misleading the public.
- **Ethical Violation:** The company's leadership and engineers did not acknowledge the broader implications of inaccurate test results on patient health.

Microscopic Vision In Ethics: Real World Case

- **Case: Theranos Blood Testing Fraud (2003-2018)**
- **Impact:** The company collapsed, its CEO Elizabeth Holmes was convicted of fraud, and patients suffered misdiagnoses.

Uncritical Acceptance

❖ **Background:**

- It is the tendency to accept ideas, orders, or norms without subjecting them to questioning, critical analysis, or evaluation.

- In an ethical context, it involves adopting or implementing decisions, practices, or policies without considering their ethical implications, consequences, or alignment with moral principles.

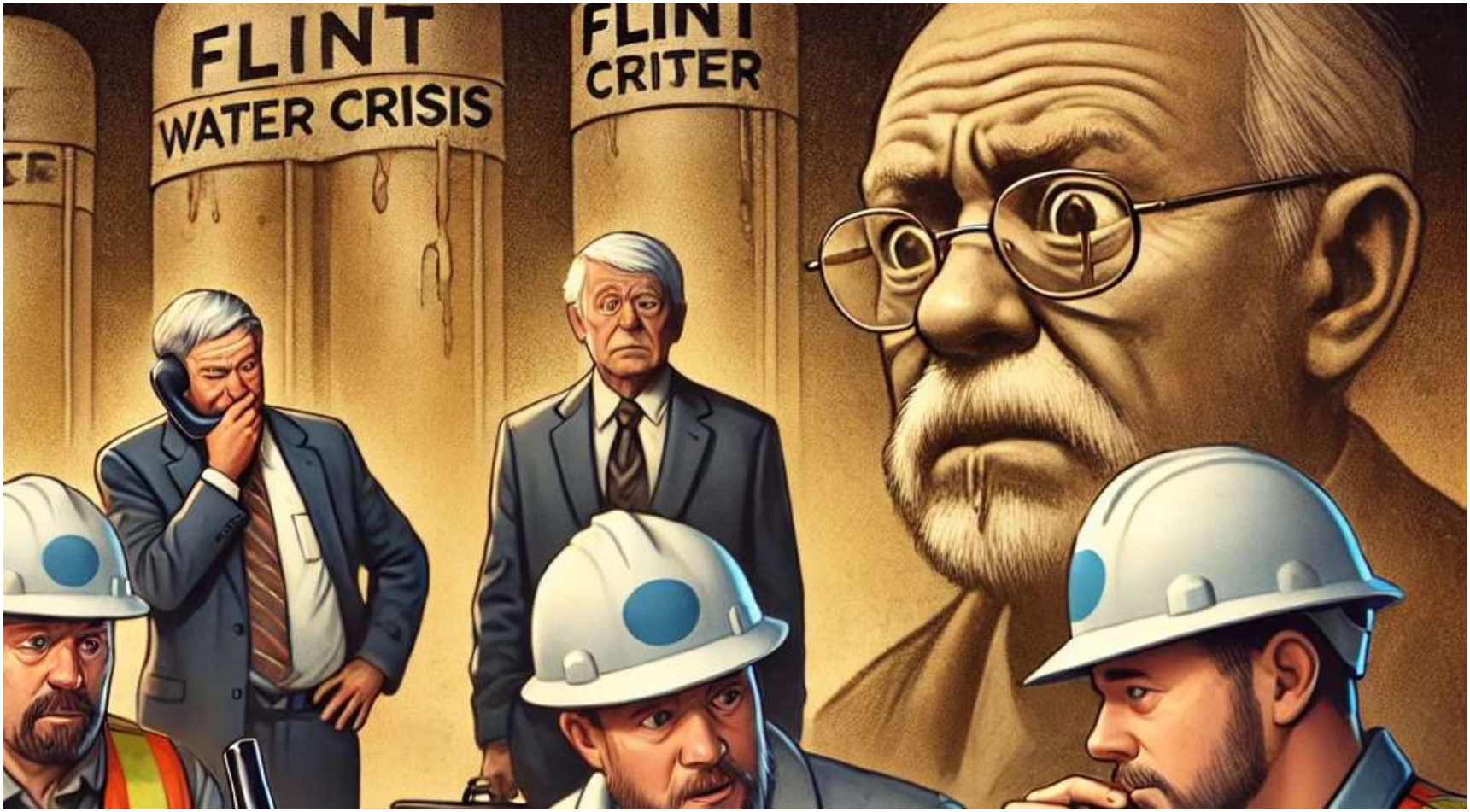
Uncritical Acceptance

❖ **Example:**

- In software engineering, uncritical acceptance occurs when engineers follow higher-up directives without ethical scrutiny, such as deploying surveillance software without considering privacy invasion or trust breaches.

- This absence of critical evaluation risks creating products that undermine ethical standards and societal values

Uncritical Acceptance: Real World Case



Uncritical Acceptance: Real World Case

❖ **Case: Flint Water Crisis (2014)**

- **Issue:** Government engineers approved the use of untreated river water despite warnings about lead contamination.
- **Ethical Violation:** Engineers followed orders without questioning their ethical implications.
- **Impact:** Thousands of residents were exposed to lead poisoning, causing severe health issues, lawsuits, and loss of trust in public institutions.

Groupthink

❖ **Background:**

- It is the is a psychological phenomenon that occurs within a group of people when the desire for harmony or conformity in the group results in an irrational or dysfunctional decision-making outcome.
- Group members try to minimize conflict and reach a consensus decision without critical evaluation of alternative viewpoints or the consideration of potential negative outcomes.

Groupthink

❖ **Example:**

- In software development, groupthink leads to flawed decisions, like rushing a product launch despite security risks, as teams avoid dissent to maintain harmony.

- This results in ignored ethical and operational risks, endangering users and harming the company's reputation.

Groupthink: Real World Case

Groupthink: Real World Case

- **Case: Deepwater Horizon Oil Spill (2010)**
- **Issue:** BP engineers ignored safety concerns to speed up deep-sea oil drilling, leading to a catastrophic explosion and the worst environmental disaster in US history.
- **Ethical Violation:** A culture of groupthink led engineers to dismiss risk assessments and warning signs.
- **Impact:** The spill caused massive environmental damage, killed 11 workers, and resulted in $65 billion in fines and settlements.

Strategies to Overcome Ethical Challenges

- To promote ethical conduct in organizations, regular ethics training and workshops are essential for understanding and recognizing ethical dilemmas.
- Creating an open communication culture enables team members to discuss ethical concerns freely and offer diverse perspectives.
- Implementing structured ethical decision-making frameworks aids in systematically addressing ethical issues.

Strategies to Overcome Ethical Challenges

- Developing critical thinking and setting clear ethical standards are crucial for informed decision-making and ethical behavior adherence.
- Leaders must exemplify ethical conduct, and regular assessments of ethical practices are necessary to maintain integrity and accountability.

Strategies to Overcome Ethical Challenges: Real World Case

Strategies to Overcome Ethical Challenges: Real World Case

❖ **Case: Johnson & Johnson Tylenol Recall (1982)**

- **Issue:** When cyanide-laced Tylenol capsules caused deaths, Johnson & Johnson immediately recalled all Tylenol products, despite financial loss.
- **Ethical Decision:** The company prioritized public safety over profits, implementing tamper-proof packaging.
- **Impact:** The crisis response restored public trust and is now considered a gold standard in corporate ethics.

Importance of Critical Thinking, In Learning, and Ethical Leadership

- Critical thinking is vital for navigating complex situations and making ethical decisions, highlighting the need to recognize biases and assess action consequences.
- Continuous learning is key to adapting to evolving ethical standards in tech, ensuring decisions align with current norms.
- Ethical leadership shapes organizational culture, guiding teams with integrity and prioritizing ethical considerations in all decisions.

Thanks

Any Question

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