

INDUSTRIAL ETHICS

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CHAPTER 1: INTRODUCTION TO ENGINEERING ETHICS



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1.1 ENGINEERING ETHICS

Introduction of ethics

Ethics is a branch of philosophy that involves the study of what is right and wrong, good and bad, just and unjust. It encompasses moral principles that govern a person's behavior or the conduct of an activity. Ethics provides a framework for understanding and evaluating moral choices and dilemmas.

Normative Ethics:

A branch of ethical theory that seeks to establish standards or norms for what constitutes right and wrong behavior. Unlike descriptive ethics, which observes and describes people's beliefs about morality, normative ethics prescribes how individuals ought to act and what moral principles should guide their actions. It provides a framework for evaluating moral actions and determining ethical conduct.

Meta Ethics:

A branch of ethical philosophy that explores the nature, scope, and meaning of ethical concepts and moral language. Unlike normative ethics, which focuses on what people ought to do (the principles that govern right and wrong actions), and descriptive ethics, which examines what people actually believe about morality, meta-ethics seeks to understand the fundamental questions underlying these beliefs and practices.

Descriptive Ethics:

A branch of ethics that focuses on describing and analyzing people's actual beliefs, values, and practices regarding morality, rather than prescribing how they should behave or making judgments about right and wrong. It is an empirical approach to understanding ethics that draws on observations and data about how individuals and cultures view moral issues text

Engineering Ethics:

A field of applied ethics that focuses on the moral and professional responsibilities of engineers. It addresses the ethical issues and dilemmas that arise in engineering practice, encompassing a wide range of topics, including safety, sustainability, public welfare, and the social implications of engineering decisions. The goal of engineering ethics is to guide engineers in making responsible decisions that prioritize public safety, environmental stewardship, and ethical integrity.

Engineering:

A broad field that applies scientific and mathematical principles to design, develop, test, and improve structures, machines, systems, and processes. Engineers use their technical knowledge and creativity to solve practical problems and create solutions that meet specific needs in various industries.

Engineer:

A professional who applies scientific and mathematical principles to design, develop, test, and maintain various systems, structures, machines, and processes. Engineers play a crucial role in creating and improving technology, infrastructure, and products that enhance our daily lives and contribute to societal advancement.

1.2 THE ORIGIN OF ETHICAL THOUGHTS

Mythical accounts

Introduction of moral codes

When did ethics begin and how did it originate? If one has in mind ethics proper—i.e., the systematic study of what is morally right and wrong—it is clear that ethics could have come into existence only when human beings started to reflect on the best way to live. This reflective stage emerged long after human societies had developed some kind of morality, usually in the form of customary standards of right and wrong conduct. The process of reflection tended to arise from such customs, even if in the end it may have found them wanting. Accordingly, ethics began with the introduction of the first moral codes.

Virtually every human society has some form of myth to explain the origin of morality. In the Louvre in Paris there is a black Babylonian column with a relief showing the sun god Shamash presenting the code of laws to Hammurabi (died c. 1750 bce), known as the Code of Hammurabi. The Hebrew Bible (Old Testament) account of God's giving the Ten Commandments to Moses (flourished 14th–13th century bce) on Mount Sinai might be considered another example. In the dialogue Protagoras by Plato (428/427–348/347 bce), there is an avowedly mythical account of how Zeus took pity on the hapless humans, who were physically no match for the other beasts. To make up for these deficiencies, Zeus gave humans a moral sense and the capacity for law and justice, so that they could live in larger communities and cooperate with one another.

That morality should be invested with all the mystery and power of divine origin is not surprising. Nothing else could provide such strong reasons for accepting the moral law. By attributing a divine origin to morality, the priesthood became its interpreter and guardian and thereby secured for itself a power that it would not readily relinquish. This link between morality and religion has been so firmly forged that it is still sometimes asserted that there can be no morality without religion. According to this view, ethics is not an independent field of study but rather a branch of theology (see moral theology).



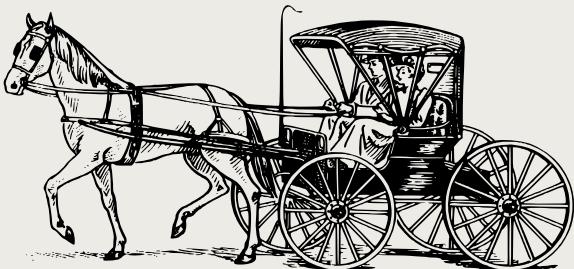
There is some difficulty, already known to Plato, with the view that morality was created by a divine power. In his dialogue Euthyphro, Plato considered the suggestion that it is divine approval that makes an action good. Plato pointed out that, if this were the case, one could not say that the gods approve of such actions because they are good. Why then do they approve of them? Is their approval entirely arbitrary? Plato considered this impossible and so held that there must be some standards of right or wrong that are independent of the likes and dislikes of the gods. Modern philosophers have generally accepted Plato's argument, because the alternative implies that if, for example, the gods had happened to approve of torturing children and to disapprove of helping one's neighbours, then torture would have been good and neighbourliness bad.

Problems of divine origin

A modern theist (see theism) might say that, since God is good, God could not possibly approve of torturing children nor disapprove of helping neighbours. In saying this, however, the theist would have tacitly admitted that there is a standard of goodness that is independent of God. Without an independent standard, it would be pointless to say that God is good; this could mean only that God is approved of by God. It seems therefore that, even for those who believe in the existence of God, it is impossible to give a satisfactory account of the origin of morality in terms of divine creation. A different account is needed.

There are other possible connections between religion and morality. It has been said that, even if standards of good and evil exist independently of God or the gods, divine revelation is the only reliable means of finding out what these standards are. An obvious problem with this view is that those who receive divine revelations, or who consider themselves qualified to interpret them, do not always agree on what is good and what is evil. Without an accepted criterion for the authenticity of a revelation or an interpretation, people are no better off, so far as reaching moral agreement is concerned, than they would be if they were to decide on good and evil themselves, with no assistance from religion.

Traditionally, a more important link between religion and ethics was that religious teachings were thought to provide a reason for doing what is right. In its crudest form, the reason was that those who obey the moral law will be rewarded by an eternity of bliss while everyone else roasts in hell. In more sophisticated versions, the motivation provided by religion was more inspirational and less blatantly self-interested. Whether in its crude or its sophisticated version, or something in between, religion does provide an answer to one of the great questions of ethics: "Why should I be moral?" (See below Ethics and reasons for action.) As will be seen in the course of this article, however, the answer provided by religion is not the only one available.



Prehuman ethics

Nonhuman behaviors

Because, for obvious reasons, there is no historical record of a human society in the period before it had any standards of right and wrong, history cannot reveal the origins of morality. Nor is anthropology of any help, because all the human societies that have been studied so far had their own forms of morality (except perhaps in the most extreme circumstances). Fortunately, another mode of inquiry is available. Because living in social groups is a characteristic that humans share with many other animal species—including their closest relatives, the apes—presumably the common ancestor of humans and apes also lived in social groups. Here, then, in the social behaviors of nonhuman animals and in the theory of evolution that explains such behaviors may be found the origins of human morality.

Social life, even for nonhuman animals, requires constraints on behaviors. No group can stay together if its members make frequent, unrestrained attacks on each other. With some exceptions, social animals generally either refrain altogether from attacking other members of the social group or, if an attack does take place, do not make the ensuing struggle a fight to the death—it is over when the weaker animal shows submissive behaviors. It is not difficult to see analogies here with human moral codes. The parallels, however, go much further than this. Like humans, social animals may behave in ways that benefit other members of the group at some cost or risk to themselves. Male baboons threaten predators and cover the rear as the troop retreats. Wolves and wild dogs take meat back to members of the pack not present at the kill. Gibbons and chimpanzees with food will, in response to a gesture, share their food with other members of the group. Dolphins support other sick or injured dolphins, swimming under them for hours at a time and pushing them to the surface so they can breathe.

It may be thought that the existence of such apparently altruistic behaviour is odd, for evolutionary theory states that those who do not struggle to survive and reproduce will be eliminated through natural selection. Research in evolutionary theory applied to social behaviour, however, has shown that evolution need not be so ruthless. Some of this altruistic behaviour is explained by kin selection. The most obvious examples are those in which parents make sacrifices for their offspring. If wolves help their cubs to survive, it is more likely that genetic characteristics, including the characteristic of helping their own cubs, will spread through further generations of wolves.



Anthropology and ethics

Many people believe that there are no moral universals—i.e., that there is so much variation from one culture to another that no single moral principle or judgment is generally accepted. It has already been shown that this is not the case. Of course, there are immense differences in the way in which the broad principles so far discussed are applied. The duty of children to their parents meant one thing in traditional Chinese society and means something quite different in contemporary Western societies. Yet, concern for kin and reciprocity are considered good in virtually all human societies. Also, all societies have, for obvious reasons, some constraints on killing and wounding other members of the group.

Beyond this common ground, the variations in moral attitudes soon become more striking than the similarities. Man's fascination with such variations goes back a long way. The Greek historian Herodotus (died 430–420 bce) relates that the Persian king Darius I (550–486 bce) once summoned some Greeks before him and asked them how much he would have to pay them to eat their fathers' dead bodies. They refused to do it at any price. Then he summoned some Indians who by custom ate the bodies of their parents and asked them what would make them willing to burn their fathers' bodies. The Indians cried out that he should not mention so horrid an act. Herodotus drew the obvious moral: each nation thinks its own customs best.

Variations in morals were not systematically studied until the 19th century, when Western knowledge of the more remote parts of the globe began to increase. In The Origin and Development of the Moral Ideas (1906–08), the Finnish anthropologist Edward Westermarck (1862–1939) compared differences between societies in matters such as the wrongness of killing (including killing in warfare, euthanasia, suicide, infanticide, abortion, human sacrifice, and duelling); the duty to support children, the aged, or the poor; forms of permissible sexual relationship; the status of women; the right to property and what constitutes theft; the holding of slaves; the duty to tell the truth; dietary restrictions; concern for nonhuman animals; duties to the dead; and duties to the gods. Westermarck had no difficulty in demonstrating tremendous diversity in what different societies considered good conduct in all these areas. More recent, though less comprehensive, studies have confirmed that human societies can and do flourish while holding radically different views about all such matters—though of course various groups within a society may do less well under some sets of beliefs than others.

As noted above, ethics itself is not primarily concerned with the description of the moral systems of different societies. That task, which remains on the level of description, is one for anthropology or sociology. In contrast, ethics deals with the justification of moral principles (or with the impossibility of such a justification). Nevertheless, ethics must take note of the variations in moral systems, because it has often been claimed that this variety shows that morality is simply a matter of what is customary and that it thus is always relative to particular societies. According to this view, no moral principle can be valid except in the societies in which it is held. Words such as good and bad just mean, it is claimed, “approved in my society” or “disapproved in my society,” and so to search for an objective, or rationally justifiable, ethics is to search for what is in fact an illusion.

One way of replying to this position would be to stress the fact that there are some features common to virtually all human moralities. It might be thought that these common features must be the universally valid and objective core of morality. This argument would, however, involve a fallacy. If the explanation for the common features is simply that they are advantageous in terms of evolutionary theory, that does not make them right. Evolution is a blind force incapable of conferring a moral imprimatur on human behaviour. It may be a fact that concern for kin is in accord with evolutionary theory, but to say that concern for kin is therefore right would be to attempt to deduce values from facts (see below The climax of moral sense theory: Hutcheson and Hume). In any case, the fact that something is universally approved does not make it right. If all human societies enslaved any tribe they could conquer, and some freethinking moralists nevertheless insisted that slavery is wrong, they could not be said to be talking nonsense merely because they had few supporters. Similarly, then, universal support for principles of kinship and reciprocity cannot prove that these principles are in some way objectively justified.

This example illustrates the way in which ethics differs from the descriptive sciences. From the standpoint of ethics, whether human moral codes closely parallel one another or are extraordinarily diverse, the question of how an individual should act remains open. People who are uncertain about what they should do will not be helped by being told what their society thinks they should do in the circumstances in which they find themselves. Even if they are told that virtually all other human societies agree and that this agreement stems from evolved human nature, they may still reasonably choose to act otherwise. If they are told that there is great variation between human societies regarding what people should do in such circumstances, they may wonder whether there can be any objective answer, but their dilemma still would not be resolved. In fact, this diversity does not rule out the possibility of an objective answer: conceivably, most societies simply got it wrong. This too is something that will be taken up later in this article, for the possibility of an objective morality is one of the constant themes of ethics

The history of Western ethics

Ancient civilizations to the end of the 19th century

The ancient Middle East and Asia

The first ethical precepts must have been passed down by word of mouth from parents and elders, but as societies learned to use the written word, they began to set down their ethical beliefs. These records constitute the first historical evidence of the origins of ethics.

The Middle East

The earliest surviving writings that might be taken as ethics textbooks are a series of lists of precepts to be learned by boys of the ruling class of Egypt, prepared some 3,000 years before the Christian Era. In most cases, they consist of shrewd advice on how to live happily, avoid unnecessary troubles, and advance one's career by cultivating the favour of superiors. There are, however, several passages that recommend more broadly based ideals of conduct, such as the following: rulers should treat their people justly and judge impartially between their subjects; they should aim to make their people prosperous; those who have bread should share it with the hungry; humble and lowly people must be treated with kindness; one should not laugh at the blind or at dwarfs.

1.3 ETHICS AND THE LAW

LAW

- Established by the government
- Organised to preserve social order
- Punishment or penalty will be given

ETHICS

- Advices individuals on what is good or bad
- Teach how to behave and make a decision
- How a person live and interact with other people

four types of relationship between law and ethic

- Legal and Ethical
- Legal but Unethical
- Ethical but Illegal
- Unethical and Illegal

LAW	ETHIC
Consists of rules and regulation	Consist of guidelines and values
Expressed in written form	It cannot be found
Formed by government	Regulated by human
Preserve social order and peace	Individual to determine what is right or wrong
Regulates the entire society and the actions	Study of normal human behavior

1.4 Defining Personal Ethics and Professional Ethics

Personal Ethic

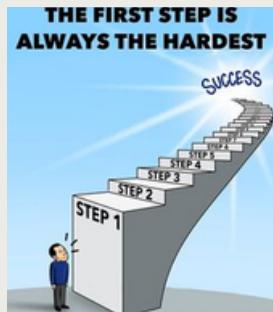
Definition: Personal ethics refers to the moral principles and values that an individual holds, guiding their behavior and decision-making in everyday life. These ethics are shaped by personal experiences, cultural influences, and individual beliefs.

Key Characteristics

- Subjectivity: Personal ethics can vary widely from person to person based on their unique backgrounds and life experiences
- Influence of Background: Factors such as upbringing, education, religion, and societal norms significantly shape an individual's ethical perspective.
- Core Values: Common elements include honesty, integrity, compassion, respect, and responsibility, which influence how individuals interact with others
- Adaptability: Personal ethics can evolve over time as individuals gain new insights and experiences.

Examples

- Honesty: Valuing truthfulness in personal interactions, such as being open with friends and family.
- Responsibility: Feeling a strong obligation to care for loved ones or contribute to community welfare



Professional Ethics

Definition: Professional ethics encompasses the moral principles and standards that govern behavior within a specific profession. These ethics are often codified in formal guidelines or codes of conduct established by professional organizations.



Key Characteristics

- Objective Standards: Unlike personal ethics, professional ethics are defined by specific rules and standards that apply to all members of a profession.
- Accountability: Professionals are expected to adhere to these ethical standards, and violations may result in disciplinary action or loss of licensure.
- Role of Organizations: Many professions have governing bodies (e.g., medical boards, engineering societies) that establish and enforce ethical guidelines to ensure public trust and accountability.
- Focus on Public Welfare: Professional ethics emphasize the responsibility of individuals toward clients, the community, and the integrity of their field.



Examples

- Confidentiality: Healthcare professionals are obligated to protect patient information and maintain privacy.
- Integrity: Engineers must prioritize public safety and transparency in their work, reporting any unethical practices they encounter.



The Impact of Personal Values on Professional Decisions

Personal values significantly shape professional decisions, influencing how individuals approach their work, make choices, and interact with others. Here's a detailed overview of this impact.

1. Decision-Making Framework

- Guiding Choices: Personal values serve as a compass for decision-making. When faced with options, individuals often reflect on their values to determine the best course of action.
- Alignment with Roles: Professionals are likely to pursue careers and roles that align with their core values, seeking work that feels meaningful and fulfilling.

Example: A person who values community service may choose to work in a non-profit organization dedicated to social causes.



2. Ethical Standards

- Foundation of Ethics: Personal values underpin ethical behavior in the workplace. Individuals with strong values such as honesty and integrity are more likely to act ethically.
- Courage to Speak Up: When personal values emphasize accountability, individuals are more inclined to report unethical behavior or advocate for ethical practices.

Example: An employee who values transparency may feel compelled to report discrepancies in financial statements, prioritizing integrity over job security.



3. Interpersonal Relationships

- Building Trust: Personal values influence how individuals relate to colleagues and clients. Values like respect and empathy foster positive relationships.
- Team Dynamics: Professionals who prioritize collaboration and communication contribute to a supportive team environment, enhancing overall morale.

Example: A manager who values teamwork may actively seek input from team members, promoting a culture of inclusion and cooperation.



4. Leadership Style

- **Value-Based Leadership:** Personal values shape leadership approaches. Leaders who value empowerment may encourage innovation and support employee development.
 - **Creating Culture:** Leaders' values can influence organizational culture, impacting employee engagement and retention.

Example: A leader who values integrity will likely model ethical behavior and promote an ethical workplace, setting the tone for the entire team.



5. Navigating Challenges

- Moral Compass: In ethical dilemmas, personal values guide individuals in making tough decisions. Strong values can help professionals stand firm in their convictions.
 - Conflict Resolution: When personal and professional values align, it becomes easier to navigate conflicts and make balanced decisions.

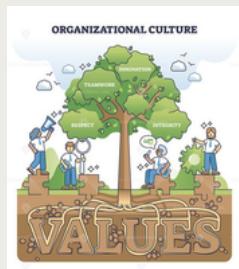
Example: A healthcare provider who values patient autonomy may advocate for a patient's right to choose their treatment, even if it contradicts institutional policies.



6. Organizational Culture

- **Influencing Norms:** When many employees share similar values, these can shape the collective culture of an organization. Shared values often lead to consistent practices and behaviors.
 - **Impact on Retention:** Organizations that reflect their employees' values typically see higher job satisfaction and employee retention.

Example: A company that emphasizes sustainability may attract employees who prioritize environmental responsibility, fostering a culture of shared commitment to eco-friendly practices



Strategies for Resolving Conflicts Between Personal and Professional Ethics

Self-Reflection	<p>Identify Core Values: Take time to reflect on your personal values and how they align (or conflict) with your professional obligations. Understanding your priorities can clarify your stance.</p> <p>Assess the Situation: Evaluate the specific circumstances surrounding the ethical dilemma. Consider the implications of your choices on both personal beliefs and professional responsibilities.</p>
Seek Guidance	<p>Consult Mentors or Colleagues: Discuss your concerns with trusted mentors or colleagues who may have faced similar dilemmas. Their insights can provide valuable perspectives and potential solutions.</p> <p>Professional Codes of Conduct: Refer to your profession's code of ethics or conduct. These guidelines can offer clarity on acceptable practices and help you navigate the conflict.</p>
Open Communication	<p>Engage in Dialogue: If appropriate, communicate your concerns with relevant stakeholders, such as supervisors or team members. Open discussions can foster understanding and lead to collaborative solutions.</p> <p>Express Your Values: Clearly articulate your personal values in the context of the conflict. This transparency can help others understand your perspective and facilitate resolution.</p>
Evaluate Alternatives	<p>Explore Compromise Solutions: Look for options that respect both your personal values and professional requirements. Compromise may lead to a solution that satisfies both sides.</p> <p>Consider Long-Term Implications: Assess the potential long-term consequences of your choices on both your career and personal integrity. This can help clarify the best path forward.</p>
Make Informed Decisions	<p>Weigh the Consequences: Consider the potential outcomes of each possible decision. Analyze how each option aligns with your personal ethics and professional obligations.</p> <p>Prioritize Ethical Integrity: In some cases, it may be necessary to prioritize your personal ethics over professional pressures, especially if the conflict involves fundamental moral principles.</p>
Develop a Plan for Action	<p>Create an Action Plan: Once you've evaluated your options, develop a clear plan for how to proceed. Outline the steps you'll take and the rationale behind your decision.</p> <p>Document the Process: Keep records of your decision-making process, including the steps taken to resolve the conflict. This documentation can be helpful if further discussions are needed.</p>
Reflect on the Outcome	<p>Review the Results: After implementing your decision, reflect on the outcomes. Consider whether the resolution aligns with your personal and professional ethics and what you might do differently in the future.</p> <p>Learn from the Experience: Use this conflict as a learning opportunity. Assess how you can better navigate similar situations in the future, strengthening your ethical decision-making skills.</p>

1.5 MICRO AND MACRO ISSUES

DEFINITION OF MICRO ETHIC

Microethics refers to the ethical decisions and responsibilities of engineers in their day-to-day professional activities, particularly in interactions with colleagues, clients, and stakeholders. It emphasizes personal accountability and ethical conduct in specific situations, often beyond what is covered by formal codes of ethics or regulations. Microethics in engineering concerns individual judgment, honesty, and integrity in routine tasks and decisions that may seem small but have important ethical implications.

Example Situation :

Imagine an engineer working on a construction project who notices a minor but potentially dangerous flaw in the design of a support beam. This flaw does not violate any specific regulations and may not be immediately apparent in larger inspections, but the engineer knows it could lead to safety issues if left unaddressed.

From a microethical standpoint, the engineer has a responsibility to address the issue by either:

- Reporting it to a supervisor or project manager, even if it might cause delays or added costs.
- Taking steps to correct it within their own scope of work if possible.

Although the issue might not be required by a code of ethics or law to be reported, addressing it aligns with microethical principles, prioritizing safety, integrity, and responsibility in a specific, real-world context.

Microethics in engineering, therefore, is about handling ethical nuances in everyday decisions, where individual accountability and moral judgment are crucial for maintaining public trust and ensuring safety.

Macroethics refers to the broader ethical responsibilities that the engineering profession has toward society at large. It focuses on large-scale ethical considerations, such as public safety, environmental stewardship, and social responsibility. Macroethics looks beyond the individual engineer's day-to-day decisions, instead addressing the collective impact of engineering practices, technologies, and projects on society and the environment. It involves creating and adhering to ethical principles and standards that guide the profession as a whole in addressing complex, often global, ethical challenges.

Example Situation :

Example Situation in Engineering

Imagine an engineering firm that specializes in building hydroelectric dams. The firm is considering a project to build a new dam on a river in a developing country. While the dam could provide affordable electricity to millions of people, it could also have significant consequences, such as:

- Displacing local communities: The construction could force thousands of people to relocate, disrupting their lives, culture, and livelihoods.
- Environmental impacts: The dam could alter the river's natural ecosystem, harming fish populations and reducing biodiversity.

A macroethical perspective would lead the engineering firm to:

- Consider the broader social and environmental impacts: Beyond the immediate technical and economic benefits, they would evaluate how the project would affect local communities, ecosystems, and long-term sustainability.
- Engage with stakeholders: Macroethics would encourage consultation with affected communities, local governments, and environmental experts to understand and mitigate potential negative consequences.
- Seek equitable solutions: This might involve designing the project to minimize environmental disruption, providing fair compensation or relocation support to displaced communities, or even finding alternative ways to meet energy needs with less social impact.

This example demonstrates how macroethics requires engineers to look beyond technical success and consider the broader ethical implications of their work on society and the planet. By embracing macroethics, the engineering profession aspires to contribute to a more just, sustainable, and responsible future.

ISSUES OF MICRO AND MACRO ETHICS

Issues : Design Competition

Definition: Design competition ethical issues arise when there's a lack of recognition for individual contributions in collaborative or competitive environments.

Ensuring fair credit for original work to avoid undervaluing contributions and maintain professional integrity.

Example	Conclusion
An engineer designs a key component for a project, but when it's presented to clients, the project lead takes all the credit	Organizations should establish clear guidelines for credit attribution, possibly documenting individual contributions in official reports.
During a company-wide competition for innovative solutions, a junior engineer's idea is used without proper acknowledgment.	Clear guidelines on credit-sharing, particularly in competitive settings, can prevent such ethical lapses and help retain talented employees.
An architect submits a design for a competitive project, but the competition committee shares their idea with another team.	Competitions should have rules that protect original ideas from being shared or misused, creating a more trustworthy environment.

ISSUES OF MICRO AND MACRO ETHICS

Issues : Conflict Of Interest

Definition: Conflict of interest in professional settings occurs when personal relationships or biases potentially influence decisions or judgments.

Maintaining impartiality in review or approval processes to ensure fair evaluation and accountability.

Example	Conclusion
A supervisor is asked to approve a project report completed by their close friend.	To avoid biased decision-making, organizations should have policies that assign impartial third-party reviewers for cases involving personal relationships.
A project manager who stands to benefit financially from a supplier's success is responsible for selecting that supplier in a bidding process.	Transparency and disclosure of potential conflicts of interest are essential. Organizations can require all employees to declare potential conflicts.
An employee is in charge of approving work done by a family member within the same department, creating possible favoritism.	Companies should implement protocols where approvals involving relatives or close friends require oversight from a neutral party.

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