Preamble (Simplified)

Engineering is a respected and vital profession that impacts everyone's quality of life. Engineers must work with honesty, fairness, and integrity to protect public health, safety, and welfare. Their behavior should always meet high ethical and professional standards.

I. Fundamental Canons (Simplified)

Engineers shall:

1. Put public safety, health, and welfare first.
2. Work only in fields where they are qualified.
3. Be honest and objective in all public statements.
4. Serve employers and clients faithfully.
5. Avoid any kind of deception.
6. Behave honorably, responsibly, ethically, and legally to uphold the profession's reputation.

II. Rules of Practice (Simplified)

1. Protect Public Safety, Health, and Welfare

- Report if your professional judgment is overruled in a way that risks life or property.
- Approve only designs that meet standards.
- Don't share client or employer information unless permitted or required by law.
- Don't partner with dishonest or fraudulent firms.
- Don't help anyone illegally practice engineering.
- Report any known code violations to proper authorities.

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4. Act as Faithful Agents or Trustees

- Disclose any conflict of interest that could affect your judgment.
- Don't take payment from more than one party unless all agree.
- Don't accept bribes or gifts related to your work.
- Avoid using government positions for personal or company benefit.
- Don't seek contracts from agencies where you or your company officials serve.

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5. Avoid Deceptive Acts

- Don't lie about your qualifications or exaggerate your role in projects.
- Don't use false claims in resumes or advertisements.
- Don't offer or accept bribes to win contracts.
- Only pay legitimate employees or agencies for securing work.

III. Professional Obligations (Simplified)

1. Uphold Honesty and Integrity

- Admit mistakes and tell the truth.
- Warn clients if a project may fail.
- Don't take outside work that harms your main job; always inform your employer first.
- Don't lure others from their jobs with false promises.
- Don't put personal gain above the profession's dignity.

- Treat everyone with fairness, respect, and equality.

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2. Serve the Public Interest

- Take part in community service and promote public safety and well-being.
- Refuse to sign or approve unsafe or non-standard work.
- Promote awareness and understanding of engineering.
- Support sustainable development and environmental protection.
- Keep learning and stay updated through practice, study, and training.

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4. Maintain Confidentiality

- Don’t share confidential business or technical information without consent.
- Don’t take new jobs or roles on specific projects using knowledge from a former employer without permission.
- Don’t represent an opposing side in a project where you have insider knowledge from previous work.

What is Philosophy (Simplified)

Philosophy is one of the oldest disciplines, beginning with early civilizations seeking knowledge about everything—earthly, human, and heavenly things.
It gave rise to many sciences:

- **Physics & Metaphysics** – study of nature and reality.
- **Ethics & Politics** – study of human life and behavior.
- **Cosmology & Theology** – study of the universe and divine things.

In short, **philosophy is the mother of all sciences.**

Understanding Philosophy

To understand philosophy, you must know:

- **Its subjects** – like metaphysics, logic, and ethics.
- **Its methods** – how knowledge is gained.

In **Western philosophy**, reasoning and argument are central.
In **Eastern philosophy**, the focus is on harmony with nature and society (the *Way* or *Dao*).

In all cultures, philosophy means **critical thinking** — being clear, logical, truthful, and open to objections.
A **philosopher** is a logical thinker who seeks truth and avoids blind belief.

Philosophy of Engineering

The **philosophy of engineering** studies:

- What engineering is,
- What engineers do,
- How engineering affects society.

It involves **ethics, aesthetics, ontology (existence), and epistemology (knowledge).**

Five Concepts in Engineering Philosophy

1. **Metaphysics** – Study of reality and existence.
2. **Epistemology** – Study of knowledge.
3. **Ethics** – Study of right and wrong.
4. **Logic** – Study of reasoning.
5. **Axiology** – Study of values.

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1. Metaphysics

Focuses on the **nature of reality** — what exists and how it's organized.
Key questions:

- Does God exist?
- What is truth?
- What makes a person the same over time?
- Are mind and body separate?
- Do we have free will?
- What causes events?

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2. Epistemology

Deals with **knowledge and how we know things.**
Main questions:

- What is knowledge?

- How do we know what we know?
- Can we be sure of what we know?
- Are we justified in claiming knowledge?

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3. Ethics

Focuses on **what is right, good, and just.**
Questions include:

- What makes actions or people good or bad?
- What makes something right or wrong?
- Is morality universal or personal?
- How should we treat others?

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4. Logic

Studies **reasoning and argument.**
Logicians ask:

- What is good or bad reasoning?
- How do we test if an argument is valid or flawed?

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5. Axiology

The study of **values and worth.**
It includes:

- **Ethics** (moral values)

- **Aesthetics** (beauty and art)

Axiology explores:

- What things are valuable and why.
- How values differ yet are real and meaningful.
  It helps us understand what people truly value in life and society.

Ethical Dilemmas

An **ethical dilemma** happens when every available option breaks some moral rule or leads to harm.
It's a situation where **no choice is fully ethical**, but a decision must still be made.

Common workplace dilemmas:

- False accounting
- Harassment
- Data misuse
- Nepotism and discrimination

In Engineering

Engineers often face dilemmas when:

- Safety, cost, and practicality conflict.
- Multiple design choices all have downsides.
- They must decide what's best for the public and explain their reasoning clearly.

Examples of Engineering Ethical Dilemmas

1. **Aircraft Design:**
   Choose between lower safety standards (cheaper, faster) or higher safety standards (costly, slower).

2. **Car Design:**
   Choose between stylish design that harms the environment or a plain design that's eco-friendly.

Ethical Issues in Computer Science & Technology

- Artificial Intelligence misuse
- Environmental damage
- Data privacy violations
- Deepfakes and misinformation
- Uncontrolled autonomous systems

Conflicts of Interest (Simplified)

Definition:
A **conflict of interest** occurs when a professional's personal interest affects — or appears to affect — their ability to make fair, unbiased decisions for clients or employers.

Example:
John, a design engineer, recommends valves made by his relative instead of better alternatives. His personal relationship influences his professional judgment — creating a **conflict of interest**.

Key Points:

- Personal interest interferes with professional duty.
- Breaks client trust and harms professionalism.
- Professionals must use **unbiased judgment** and disclose any conflicts.

Types of Conflicts:

1. **Actual conflict:** Interests directly affect judgment.
2. **Potential conflict:** May become an actual conflict if certain actions are taken.
3. **Apparent conflict:** Looks like a conflict to others, even if none exists.

Avoidance:
Engineering codes of ethics (like **NSPE Canon 4**) require:

- Full **disclosure** of conflicts to clients or employers.
- **No acceptance** of financial benefits, gifts, or commissions from suppliers or contractors.
- **Faithful service** to employer and client interests.

Whistleblowing (Simplified)

Meaning:
Whistleblowing is when an **insider** exposes wrongdoing or harmful practices in an organization, usually **outside official channels.**

Origin:
Like a **referee** or **police officer** blowing a whistle to stop a foul — but here, the person calls out their *own* organization.

Key Traits:

1. Reveals hidden or secret wrongdoing.
2. Does so outside approved company systems.
3. Raises questions of loyalty to the organization.

Whistleblowing & Loyalty

- A whistleblower risks company loyalty to protect public interest.
- They reveal information the company doesn't want public.
- Their goal is to prevent harm, not to betray — but to **serve higher moral duty**.

DeGeorge's Justification for Whistleblowing

Morally Permissible if:

1. The product or action causes serious public harm.
2. Concerns are first reported to superiors.
3. All internal channels are used but fail.

Morally Obligatory if:

1. The employee has **strong evidence** proving wrongdoing.

2. Revealing it **prevents serious harm** to the public.

Main Idea:
Whistleblowing is justified to prevent harm and protect public welfare when all other options fail.

Cyber Crime (Simplified)

Definition:
Cybercrime is **criminal activity using computers or networks** to steal data, cause harm, or commit fraud.

Examples:

- Identity theft and hacking
- Malware and phishing
- Data breaches and scams
- Spreading illegal or offensive content

Key Points:

- Computers can be **tools** or **targets** of cybercrime.
- Many traditional crimes now happen online.
- Cybercriminals exploit weak systems and human mistakes.
- Bangladesh passed the **Cyber Security Act (2023)** to combat these crimes.

Common Cyber Crimes:

- Fraud, identity theft
- Phishing scams
- Spam and harassment

- Malware and illegal content distribution

Copyright (Simplified)

Definition:
Copyright is a **legal right** that protects creators of original works (literary, artistic, musical, etc.) by giving them control over how their work is used.

Purpose:

- Encourages creativity and innovation.
- Ensures creators earn recognition and payment.
- Protects the **expression of ideas**, not the ideas themselves.

Key Points:

- Creators hold exclusive rights for a limited time.
- Rights include copying, distributing, and adapting their work.
- They can **sell or license** these rights to others.
- Exceptions allow limited use without permission (like education or review).
- In **Bangladesh**, copyright lasts **60 years after the creator's death.**

Global Note:
Countries under the **Berne Convention** follow similar rules for protecting creative works.

Utilitarian Approach (Simplified)

Core Idea

The main principle of the **utilitarian model** is:

> *"We should act in ways that maximize overall well-being."*

To apply this principle, we must:

1. Identify the **audience** — the group whose well-being will be affected.
2. Choose the action that brings the **most good** (benefit) and the **least harm**, both in the short and long term.

Audience

The **audience** includes everyone whose welfare is influenced by a decision.

- Ideally, this should include **all humans**, or even **animals** that can feel pleasure or pain.
- However, calculating the total good for such a large audience is extremely complex.
- Limiting the audience to a smaller group (like a country, company, or community) makes it easier — but risks unfairly excluding others.

Therefore, utilitarians must find **reasonable and fair ways** to define the scope of the audience.

Cost–Benefit Test of the Utilitarian Approach

If utilitarianism requires maximizing well-being, we must decide **how to measure** benefits and harms.
Engineers often use **Cost–Benefit Analysis (CBA)** — choosing the option that gives the **highest benefit** compared to its **cost**.

In this method, both positive and negative effects are converted into **monetary terms**.
A related concept is **Risk–Benefit Analysis (RBA)**, which compares potential risks and

benefits.
Since risks are harder to measure, CBA is more commonly used.

Applying the Cost–Benefit Test

Three Steps:

1. **Identify options** available to solve the problem.

2. **Measure costs and benefits** (in money) for each option, considering **everyone affected** by the decision.

3. **Choose the option** that gives the **greatest benefit relative to its cost**, ensuring no better use of resources exists to solve the same problem.

Test of Maximizing Good Consequences

Not all utilitarian approaches rely on exact numbers or money values.
Instead, they ask:

> *"Which action produces the most good overall?"*

An action is considered **right** if it creates **more good consequences** than any available alternative.

Applying the Maximizing Good Consequences Test

Three Steps:

1. Identify the possible **options** for action.

2. Decide the **appropriate audience** whose welfare is affected.

3. Choose the option that provides the **greatest overall good**, considering both **benefits and harms**.

The Rules and Practices Test

It's one thing to judge the utility of a **single act**, and another to judge the utility of a **general rule or practice**.
Sometimes, it's better to evaluate whether following an **established rule** leads to the most good.

For example:
Traffic laws are designed for public safety. Even if it's late at night and no one is around, running a red light may seem harmless, but the **general practice** of obeying signals has **greater utility** for everyone.
Thus, from a utilitarian view, we should normally **follow established rules** that serve public good, rather than making exceptions for personal convenience.

Applying the Rules and Practices Test

Four Steps:

1. Identify the **existing practice or rule** that applies to the situation.

2. Determine if this practice **promotes the most utility** compared to alternatives.

3. If no suitable rule exists, **choose or create** one that would bring the **best long-term results** overall.

4. **Follow the justified practice**, unless there's a strong utilitarian reason to make an exception in that specific case.