



ENGINEERING ETHICS & ATTITUDE

Lecture 1.

**THE IMPORTANCE OF ETHICS IN
ENGINEERING – ANCIENT ETHICS**

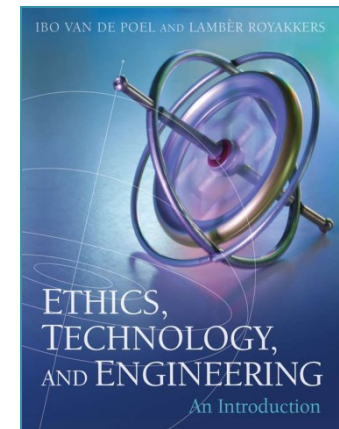
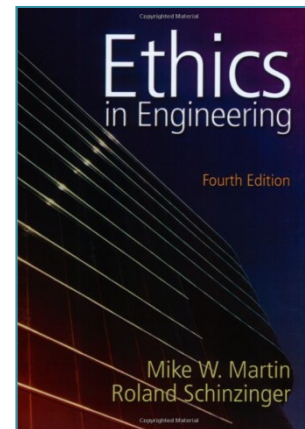
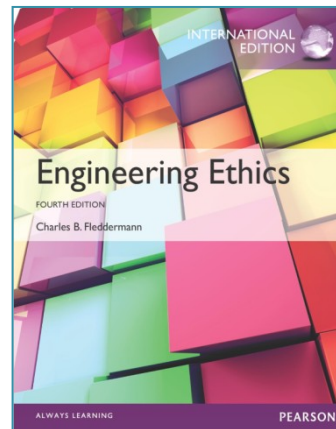
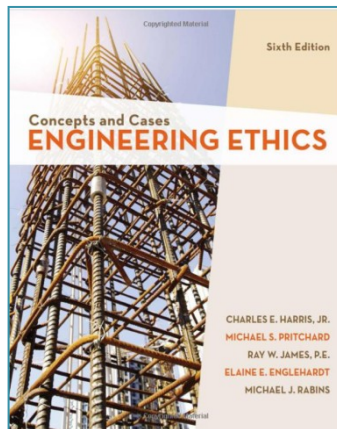
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2020**

RECOMMENDED READINGS

- https://www.tutorialspoint.com/engineering_ethics/index.htm
- **Charles Harris, Michael Pritchard, and Michael Rabins:** Engineering Ethics: Concepts and Cases (6th edition, CENGAGE, Boston USA, 2017)



- **Fleddermann, C.B.** (2011): Engineering Ethics. Prentice Hall, 4th edition
- **Mike W. Martin, Roland Schinzinger** (2005): Ethics in Engineering, Mc Graw Hill, 4th edition
- **Van de Poel, I., and L. Royakkers** (2011): Ethics, Technology, and Engineering: An Introduction. Wiley-Blackwell
- **Dave Robinson** (2012): Introducing Ethics for Everyday Life: A Practical Guide. Icon Books Ltd, UK
- **Code of Professional Conduct of the European Council of Civil Engineers (ECCE)**
- http://www.ecceengineers.eu/about/code_of_conduct.php
- **Code of Ethics of the American Society of Civil Engineers (ASCE)**
- <http://www.asce.org/code-of-ethics/>

WHAT IS / ARE ETHICS?

1

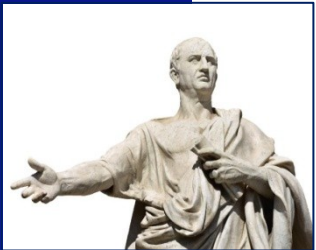
- Meaning of Greek word *ethos*: character
- **Ethics** (*plural but usually singular in construction*):
 - 1 the discipline dealing with what is **good** and **bad** or **right** and **wrong** or with *moral duty* and *obligation*
 - 2 a: a group of *moral principles* (i. e. those related to **right** and **wrong** behaviour and the **goodness** or **badness** of human character), or set of *values*
 - b: a particular theory or system of *moral values*
 - c: the *principles of conduct* governing an individual or a profession: *standards of behaviour*
 - 3: character or the *ideals of character* manifested by a race or people, as an *attitude*

(Webster Dictionary of American English)

WHAT IS MORALITY?

1

- **Ethics** comes from the ancient Greek word “*ethikos*” derived from “*ethos*” which means custom or habit
- The Roman politician, lawyer and bon vivant **Cicero** (106-43 B.C.) coined the term “*moralis*” as a Latin equivalent of “*ethikos*”
- Historically, the roots of the words “*ethics*” and “*morality*” meant the same thing; one was a translation of the other
- Still, the meaning of words and phrases can and does change, so the fact that “*ethics*” and “*morality*” used to refer to the same idea doesn't necessarily mean that it's wise to use them this way today



EVERYDAYS' QUESTIONS TO BE ANSWERED

- Do you generally *distinguish* easily **good** from **bad**, or (morally) **right** from **wrong**?
- Why do we *think* certain acts are **right** or **wrong**?
- What *makes* an action morally **right** or **wrong**?
- When you disagree with people about a moral issue – do you fully understand what are you *really* disagreeing about?
- Are you ever *unsure*, whether an act is morally **wrong** or not?
- Ethical choice is based first of all on acquired *knowledge* or *instincts*? Or both?



WHAT IS / ARE ETHICS?

1

- Ethics involves *learning* what is **right** and **wrong** and then *doing* the **right** thing
- Most ethical decisions have extended consequences and ethics requires *weighing the consequences* of alternative course of action
- Most ethical decisions are not black or white but rely on reasoning through conflict situations using some *standard of guidance*
- Most ethical decisions have *personal implications*
- Ethical decisions should respect the *rights of* those who are *affected* by our actions

WHAT IS / ARE ETHICS?

2

- *Ethics* involves systematizing, defending, and recommending concepts of **right** and **wrong** behaviour or action
- A central aspect of ethics is *the good life*, the life **worth living**, or life that is simply **satisfying**
- Most religions have an *ethical component*, often derived from purported supernatural revelation or guidance
- *Divine command theory* proposes that an action's status as morally good is equivalent to whether it is commanded by God, thus to be moral is nothing else, than to follow divine commands

WHAT IS MORALITY?

1

- Generally, the terms *ethics* and *morality* are used interchangeably, although a few different communities (e. g. academic, legal, or religious) will occasionally make a distinction
- Morals are the principles or habits with respect to right or wrong of one's own conduct
- They are not imposed by anyone
- Morals are what you think is good and bad personally

WHAT IS MORALITY?

2

- The word *morality* carries the concepts of:
 - (1) moral standards, with regard to behaviour;
 - (2) moral responsibility, referring to our conscience; and
 - (3) a moral identity, or one who is capable of right or wrong action
- *Morality* describes the principles that govern our behaviour; without these principles in place, societies cannot survive for long
- Everyone adheres to a *moral doctrine* of some kind

WHAT IS MORALITY?

2

- **A person who strictly follows a set of ethical principles, may not have any moral at all while a person who violates ethical principles at times, may maintain a high moral integrity**
- **Morals are always defined by one's own personality**
- **Morals can be changed according to one's beliefs as they are completely dependent on one's perception towards the ethical values**

BRANCHES OF ETHICS

1

- There are five branches of ethics:
 - ***Normative Ethics*** - The largest branch, it deals with how individuals can figure out the correct moral action that they should take
 - ***Meta-Ethics*** - This branch seeks to understand the nature of ethical properties and judgments such as if truth values can be found and the theory behind moral principals.
 - ***Applied Ethics*** - This is the study of applying theories from philosophers regarding ethics in everyday life and professional activity

BRANCHES OF ETHICS

2

- ***Moral Ethics*** - This branch questions how individuals develop their morality, why certain aspects of morality differ between cultures and why certain aspects of morality are generally universal
- ***Descriptive Ethics*** - This branch is more scientific in its approach and focuses on how human beings actually operate in the real world, rather than attempt to theorize about how they should operate

ETHICS FOR ENGINEERS 1

- **Engineering is the process of developing an efficient mechanism which quickens and eases the work using limited resources, with the help of technology.**
- **Ethics are the principles accepted by the society, which also equate to the moral standards of human beings**
- **An engineer with ethics, can help the society in a better way**

ETHICS FOR ENGINEERS 2

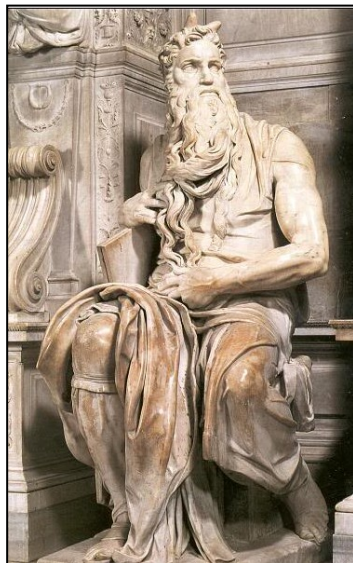
- The study of **Engineering Ethics**, where such ethics are implemented in engineering by the engineers, is necessary for the good of the society
- **Engineering Ethics** is the study of decisions, policies and values that are morally desirable in engineering practice and research

ENGINEERING ETHICS

- ***Engineering ethics*** is the field of applied ethics and system of moral principles that apply to the practice of engineering
- It examines and sets the ***obligations*** by engineers; ***codes of engineering ethics*** identify a specific precedence with respect to the engineer's consideration for the public, clients, employers, and the profession
- General principles of the codes of ethics are largely similar across the various ***engineering societies*** and ***chartering authorities*** of the world

DIVINE COMMAND THEORIES - RELIGIOUS ETHICS

- Followers of both monotheistic and polytheistic religions accepted the importance of God's commands in establishing *morality*
- God gave Moses the *Ten Commandments* on Mount Sinai to serve as principles of moral behaviour for the human race (Hebrew Bible)



1. You shall have no other gods before me
2. You shall not make for yourself an idol
3. You shall not misuse the name of the Lord your God
4. Remember the Sabbath day by keeping it holy
5. Honor your father and your mother

6. You shall not murder
7. You shall not commit adultery
8. You shall not steal
9. You shall not give false testimony against your neighbor.
10. You shall not covet. . . anything that belongs to your neighbor.

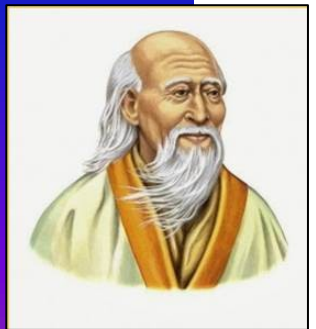
BUDDHIST ETHICS

- Ethics traditionally based on the *enlightened perspective* of the *Buddha* (4th century B.C.), or other enlightened beings who followed him
- Moral instructions are included in Buddhist *scriptures* or handed down through *tradition*
- Foundation of Buddhist ethics for laypeople is the Pancasila (*Five Precepts*): **NO** killing, stealing, lying, sexual misconduct, or intoxicants
- The initial percept is non-injury or *non-violence* to all living creatures
- The precepts are only the most rudimentary code of moral training leading towards *enlightenment*



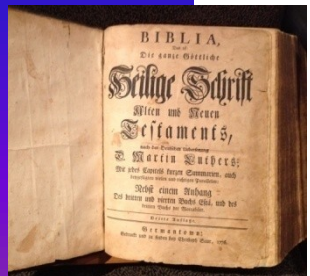
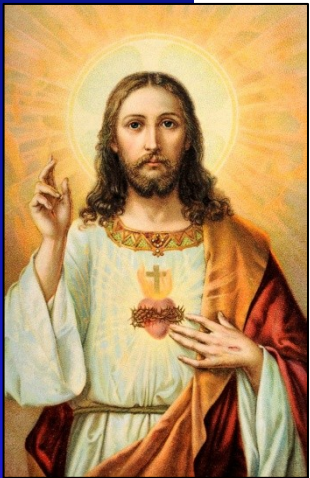
CONFUCIAN & TAOIST ETHICS

- Confucianism emphasize the maintenance and propriety of *relationships* as the most important consideration in ethics: to be ethical is to do what one's relationships require
- **Confucius** (551- 479 B.C.) stresses *honesty* (meaning *sincerity* and *fidelity* too) to the ones to whom one owes one's existence (parents) and survival (neighbours, colleagues, inferiors in rank)
- Taoist ethics (**Lao Tzu**; ?-531 B.C.) ask for a greater *sense of being* and less identification with *the act of doing*
- Taoist *passivity* nurtures, cultivates and prepares an atmosphere that allows *the majestic* and *the real* to shine, influencing society for the better



CHRISTIAN ETHICS

- It's principles are based on the teachings within the Bible; they begin with the notion of *inherent sinfulness*, which requires essential *atonement*
- Christian ethics in general has tended to stress the need for *love*, *grace*, *mercy*, and *forgiveness* because of sin (estrangement from God which is the result of not doing God's will)
- With divine assistance, the Christian is called to become increasingly *virtuous* in both *thought* and *deed*; recommended ethical behaviours originate in the Old Testament's Ten Commandments
- Christian ethics *isn't substantially different* from Jewish ethics, except in the exhortation to love one's enemy



ISLAMIC ETHICS

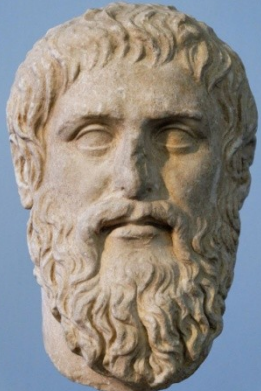
- Regardless of their environment, humans are believed to have a *moral responsibility* to submit to God's will and to follow Islam
- **Muhammad** (570-632) was sent by God to remind human beings of their *accountability* to God
- Muslims look to the Glorious Qur'an and the Traditions of the Prophet as their *moral guides*
- Muhammad summarized the *conduct* of a Muslim:
 - *to remain conscious of God, whether in private or in public*
 - *to speak justly, whether angry or pleased*
 - *to show moderation both when poor and when rich*
 - *to reunite friendship with those who have broken off with me*
 - *to give to him who refuses me*
 - *that my silence should be occupied with thought*
 - *that my looking should be an admonition*
 - *that I should command what is right*
- Morality in Islam addresses *every aspect* of human life



THE EUTHYPHRO DILEMMA

1

- Adherents believe that moral obligation is *obedience* to God's commands; right acts are right because they are the actions that God commands to perform
- The *Euthyphro Dilemma* formulated by ancient Greek philosopher **Plato**: either
 - (i) The act is right *only because* God commanded that we do it,
or
 - (ii) God commanded that we do it because the act is right *for independent reasons*
- If (i) is true, morality and God's commands are *arbitrary*; if (ii), the command *couldn't be divine*
- Non-believers/atheists are immoral per se?
- Abandon divine command theories?

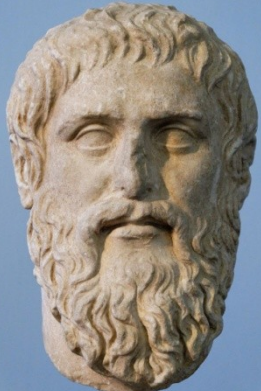


428-348 B.C.

THE EUTHYPHRO DILEMMA

2

- The Euthyphro Dilemma can elicit the response that an action is good *because God commands* it, or that God commands an action *because it is good*
- If the first is chosen, it would imply that whatever God commands must be good: even if he commanded someone to inflict suffering, then inflicting suffering *must be moral and acceptable, even mandatory*

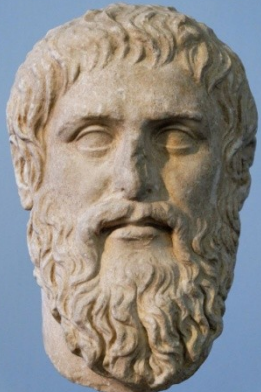


428-348 B.C.

THE EUTHYPHRO DILEMMA

3

- If the latter is chosen, then morality is no longer dependent on God, defeating the *divine command theory*; additionally, if God is subject to an external law, *he is not* sovereign or *omnipotent*, which would challenge the orthodox conception of God
- Divine command theory is *obviously wrong* because either answer challenges the ability of God to give moral laws *to be accepted and followed* by all



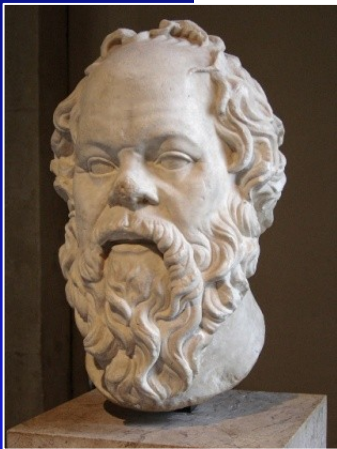
428-348 B.C.

SOCRATES'S ETHICAL PHILOSOPHY

1

- **Main Points:**

- Self-knowledge is a *sufficient condition* to the good life, i.e. knowledge identifies with virtue. If knowledge can be learned, so can virtue - thus, virtue can be taught
- “The unexamined life is *not worth* living.” One must seek knowledge and wisdom before private interests. In this manner, knowledge is sought *as a means to* ethical action.
- What one truly knows is the dictates of one's conscience or soul: these ideas form the philosophy of the *Socratic Paradox*: people act *immorally*, but they do not do so *deliberately*

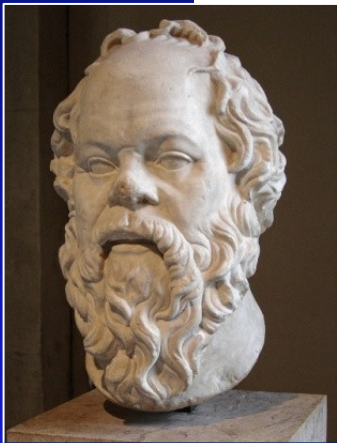


469-399 B.C.

SOCRATES'S ETHICAL PHILOSOPHY

2

- The outline of the paradox:
 - a. Everyone seeks what is most serviceable to himself. If you know what is good, you will always act in a way to achieve it
 - b. If you act in such a way that it is not conducive to your good, then you must have been mistaken (i.e., ignorant)
 - c. If you act with knowledge, then then what you get is the most serviceable to yourself
 - d. **knowledge** = (def.) virtue, good, *arete*; **ignorance** = (def.) bad, evil, not useful
 - e. Since no one knowingly harms himself, if harm comes to you, then you acted in ignorance
 - f. We are responsible for what we know or for that matter don't know

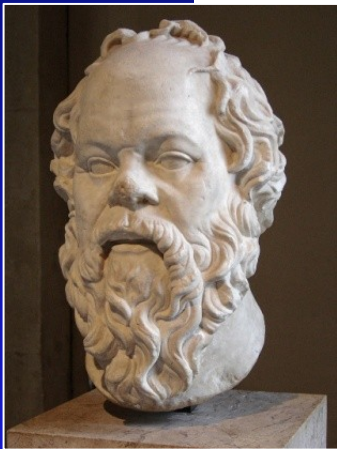


469-399 B.C.

SOCRATES'S ETHICAL PHILOSOPHY

3

- **Reason** is essential for the **good life**
 - One's true happiness is promoted by doing what is right
 - When your true utility is served (by tending your soul), you are achieving happiness; so happiness is evident only in terms of a long-term effect on the soul
 - A mechanistic explanation of human behavior is mistaken; human action aims toward the good in accordance with purpose in nature

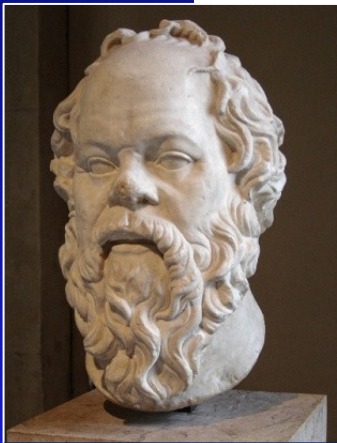


469-399 B.C.

SOCRATES'S ETHICAL PHILOSOPHY

4

- No one chooses **evil**; no one chooses to act in **ignorance**
 - We seek the good, but fail to achieve it by ignorance or lack of knowledge as to how to obtain what is good
 - He believes no one would intentionally harm themselves. When harm comes to us, although we thought we were seeking the good, the good is not obtained in such a case, since we lacked knowledge as to how best to achieve the good
 - Aristotle's criticism of Socrates belief that no one intentionally harms oneself is that an individual might know what is best, and yet still fail to act rightly



469-399 B.C.



A section of the **Morandi highway bridge (Genova, Italy)** fell during heavy rain on 14.08.2018, hurling dozens of cars and several trucks onto railway tracks below (43 victims).

The **Morandi bridge**, named after the architect who designed it in the 1960s, "collapsed because it could no longer stand" due to negligent maintenance.



FOOD FOR THOUGHT (EXAMPLE 1)

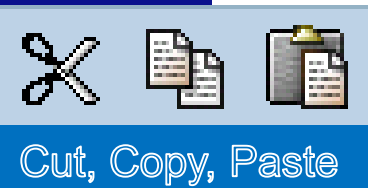
- After a recent collapse of a structure in which many people died, an engineer came to know about a bridge which is marginally safe



- He informed his superior who asked him to stay calm and not to discuss with anyone, while waiting for the next year budget sessions to get some financial help for the repair required
- What should the engineer do?

FOOD FOR THOUGHT (EXAMPLE 2)

- What should an engineer who observes his colleague copying confidential information unauthorized, do immediately?



- If he chooses to stop his friend, what if this gets repeated without his notice?
- If he chooses to report the management, what if his friend loses the job?
- Which is morally correct?



FOOD FOR THOUGHT (EXAMPLE 3)

- An engineer who develops a prototype for the project, loses it due to a mishap exactly the day before the submission



- Is it morally correct to outsource the prototype of the project and reduce the risks of job insecurity?
- What should he do?