

HUM-351

Becoming an ethical engineer

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Cursus	Sem.	Type
Humanities and Social Sciences	BA5	Obl.

Language of teaching	English
Credits	2
Session	Winter
Semester	Fall
Exam	During the semester
Workload	60h
Weeks	14
Hours	2 weekly
Lecture	2 weekly
Number of positions	80

Remark

Une seule inscription à un cours SHS+MGT autorisée. En cas d'inscriptions multiples elles seront toutes supprimées sans notification

Summary

Students will develop an understanding of the psychological and social processes of learning the following competences: (i) ethical sensitivity, (ii) ethical reasoning, (iii) ethical motivation, and (iv) ethical agency. Students will, at the same time, develop these capabilities.

Content

Alongside the philosophical study of engineering ethics itself, sociologists and psychological researchers have long been interested in the processes through which people develop the capability to act in ethical or 'pro-social' ways. A commonly used psychological framework for thinking about these questions identifies that ethical or pro-social action requires a mix of (i) ethical sensitivity (the ability to identify ethical issues in a given situation), (ii) ethical reasoning capacity (the ability to apply values to an ethical situation and identify the most appropriate course of action), (iii) ethical motivation (the motivation to act on that decision) and (iv) ethical agency (the ability to take action in a given social or organisational context to achieve the desired outcome). This range of constructs includes both cognitive elements (e.g. reasoning, imaginative perspective taking) as well as affective elements (e.g. motivation, compassion, emotion regulation etc.). They also require an understanding of social systems, at both a micro and a macro level. These elements, in turn, are linked to particular processes of learning and development. This course will explore how these ideas help to understand how people learn to become pro-social or ethical in their behaviour.

It will focus both on (i) learning to be ethical in an engineering context and, at the same time, (ii) on understanding the processes through which people learn to be ethical.

Keywords

Engineering Ethics; Learning Sciences; Emotion; Cognition

Learning Outcomes

By the end of the course, the student must be able to:

- Describe what is meant by (i) ethical sensitivity, (ii) ethical reasoning capacity, (iii) ethical motivation and (iv) ethical agency
- Apply these terms to understand pro-social behaviour of engineers
- Describe how social factors (organisational climate, social group identity) enable or constrain pro-social behaviour in engineering contexts
- Describe how cognitive and emotional factors interact in the learning of these ethical capabilities

- Assess / Evaluate the likely impact of different ethics education strategies on students becoming ethical engineers

Transversal skills

- Communicate effectively, being understood, including across different languages and cultures.
- Take account of the social and human dimensions of the engineering profession.
- Assess one's own level of skill acquisition, and plan their on-going learning goals.

Teaching methods

Teaching will include a mix of traditional lectures which will cover the psychological and social processes of learning to be ethical, as well as a series of activities in which these concepts will be applied by students. In these applied exercises students will

- (a) engage with an engineering ethics case study/dilemma
- (b) analyse the dilemma in light of a series of guiding questions
- (c) reflect on their learning from this and its potential application of to real world case scenarios

Expected student activities

Alongside some more traditional lectures, the teaching approach will prioritise active learning and collaborative group work. Students are expected to participate actively in the learning activities which are managed in the class time and to complete some reading and application exercises after class.

Assessment methods

The course is assessed

80% through a portfolio in which students will collect artefacts (readings/ descriptions of experiences), and will analyse them in terms of the concepts of the course

20% through a (short) in-class assessment based on assigned readings.

Resources

Bibliography

Downey, G. L. 2014. The Normative Contents of Engineering Formation: Engineering Studies, In *Cambridge Handbook on Engineering Education Research*, edited by Johri, A. and Olds, B., 673-711, Cambridge: Cambridge University Press.

Hoffman, M.L. 2008. Empathy and Prosocial Behaviour. In *Handbook of Emotions, Third Edition*, edited by Lewis, M., Haviland-Jones, J.M., and Feldman Barrett, L., 440-455, London: Guilford Press.

Lönngren, J. 2020. Exploring the discursive construction of ethics in an introductory engineering course. *Journal of Engineering Education*, 110(1): 44-69 <https://doi.org/10.1002/jee.20367>

Van der Poel, I. and Royackers, L. 2011. *Ethics, Technology and Engineering, An Introduction*. Chichester: John Wiley and Sons.

Ressources en bibliothèque

- [Cambridge Handbook on Engineering Education Research](#)
- [Handbook of Emotions](#)
- [Ethics, Technology and Engineering, An Introduction](#)

Moodle Link

- <https://go.epfl.ch/HUM-351>