

ENV-470

**Development engineering**

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Cursus	Sem.	Type
Environmental Sciences and Engineering	MA2, MA4	Opt.
Minor in Integrated Design, Architecture and Sustainability	E	Obl.

Language of teaching	English
Credits	4
Session	Summer
Semester	Spring
Exam	During the semester
Workload	120h
Weeks	14
<b>Hours</b>	<b>4 weekly</b>
Courses	2 weekly
TP	2 weekly
<b>Number of positions</b>	

**Remark**

Development Engineering: Innovation and Technologies in the Global South

**Summary**

This course teaches the fundamentals of technologies for development (Development Engineering) to design, pilot, and evaluate appropriate, affordable and robust technologies to address sustainable development challenges (e.g. poverty, environmental degradation) in emerging and developing countries.

**Content****Lectures:**

- Week 1 (SH): Introduction to the course and to Development Engineering
- Week 2 (SH): What is poverty?
- Week 3 (SH): Innovative technologies for poverty reduction and sustainable development
- Week 4 (SH): Design thinking
- Week 5 (SH): Quantitative and qualitative research methods
- Week 6 (SH): Guest lecturer from the Swiss Red Cross
- Week 7 (KS) EssentialTech experience and projects
- Week 8 (KS) Flipped classroom: Project strategy
- Week 9 (KS) Flipped classroom: Product Value Chain (Part I)
- Week 10 (KS) Flipped classroom: Product Value Chain (Part II)
- Week 11 (KS) Flipped classroom: Sustainable Business Model Canvas
- Week 12 (SH): Sustainability of development projects
- Week 13 (KS +SH): Presentation of group work and discussion
- Week 14 (SH+KS): Presentation of group work and discussion

**Keywords**

Development, development engineering, developing countries, emerging countries, Global South, poverty reduction, social entrepreneurship, technologies for development, sustainable business models, design thinking, human-centered design, value chain canvas, scale-up

**Learning Outcomes**

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

- Explain the technology for development intervention cycle
- Integrate the principles and elements of Development Engineering
- Distinguish appropriate, affordable and robust devices, technologies or technological interventions for development

- Differentiate the main development challenges faced by emerging and developing countries.
- Compare different approaches to technological development.
- Examine information in an interdisciplinary manner integrating the contributions and expertise of different disciplines.
- Identify sustainable solutions to complex problems.
- Apply the sustainable and socially responsible value chain canvas to specific contexts.

### Transversal skills

- Set objectives and design an action plan to reach those objectives.
- Access and evaluate appropriate sources of information.
- Communicate effectively, being understood, including across different languages and cultures.
- Identify the different roles that are involved in well-functioning teams and assume different roles, including leadership roles.
- Continue to work through difficulties or initial failure to find optimal solutions.
- Collect data.
- Give feedback (critique) in an appropriate fashion.
- Take account of the social and human dimensions of the engineering profession.

### Teaching methods

Lectures (100% in English), group work/presentation, projection of film and discussion, and mandatory reading list.

### Expected student activities

Homework, group work and presentation, mandatory reading of background material.

### Assessment methods

- Presentation of group work (50%) with individual contributions of each student
- Group report (40%)
- Continuing assessment (10%)

### Supervision

Office hours	Yes
Assistants	No
Forum	No
Others	Available for questions before the lectures.

### Resources

#### Bibliography

Woolridge, Adrian. 2010. The world turned upside down. A special report on innovation in emerging markets. *The Economist*, 17.04.2010: 1-14

The final bibliography will be provided during the first day of the course.

#### Websites

- <http://www.journals.elsevier.com/development-engineering/>
- <http://essentialtech.epfl.ch>
- <http://cooperation.epfl.ch>
- <http://sustainabledevelopment.un.org>
- <http://unsdsn.org>

- <http://www.gapminder.org>

#### **Moodle Link**

- [http:// Moodle link will be provided at course inception.](#)

#### **Videos**

- [http:// Various TED conferences](#)