

CIVIL-239

Engineering a sustainable built environment

Sonta Andrew

Cursus	Sem.	Type
Civil Engineering	BA3	Obl.
HES - GC	H	Obl.

Language of teaching	English
Credits	3
Session	Winter
Semester	Fall
Exam	Written
Workload	90h
Weeks	14
Hours	3 weekly
Courses	2 weekly
Exercises	1 weekly
Number of positions	

Summary

This course explicitly addresses the issue of sustainability in the built environment through an engineering lens. It covers the sustainability and energy landscape, approaches to sustainability in civil engineering, and specific tools for enacting sustainability in civil engineering.

Content

The course introduces the intersections between different areas of civil engineering and sustainability topics, the engineering knowledge needed to address sustainability topics, and engineering tools that can be used to analyze and assess sustainability.

Topics covered include:

- The sustainability landscape
- Energy supply and demand
- Mobility and sustainability
- Materials and structures
- Natural systems
- Sustainability in the civil engineering profession

Engineering knowledge and tools covered include:

- Energy
- Systems thinking
- Life cycle assessment
- Engineering economics and decision-making

Keywords

Sustainability, energy, life-cycle assessment, systems thinking, civil engineering

Learning Prerequisites**Required courses**

None

Important concepts to start the course

None

Learning Outcomes

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

- Explain to an engineer, designer, policy-maker, or other professional why sustainability is important in civil

engineering.

- Assess / Evaluate and be critical of metrics used to measure sustainability.
- Analyze civil engineering systems in the context of sustainability.
- Quantify environmental, economic, and social impacts of the built environment.
- Construct models of systems to understand complexity of engineered civil systems.

Transversal skills

- Communicate effectively, being understood, including across different languages and cultures.
- Demonstrate the capacity for critical thinking
- Take account of the social and human dimensions of the engineering profession.
- Take responsibility for environmental impacts of her/ his actions and decisions.

Teaching methods

Lectures, exercises, discussion

Expected student activities

Attend lectures, participate in class discussions and activities, complete exercises

Assessment methods

Midterm exam (30%)

Exercises (20%)

Final exam (50%)

Supervision

Office hours	Yes
Assistants	Yes
Forum	Yes

Resources

Virtual desktop infrastructure (VDI)

No

Moodle Link

- <https://go.epfl.ch/CIVIL-239>