

CIVIL-424

Innovation for construction and the environment

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Cursus	Sem.	Type
Civil Engineering	MA1, MA3	Opt.

Language of teaching	English
Credits	3
Session	Winter
Semester	Fall
Exam	During the semester
Workload	90h
Weeks	14
Hours	3 weekly
Lecture	2 weekly
Practical work	1 weekly
Number of positions	

Summary

The goal of the course is to seek to instill in its future graduates the skills necessary to be successful in the civil engineering industry. One skill that appears underserved and is expected to be strengthened through this course is the skill to innovate.

Content

- The construction sector from an innovation point of view – historical aspects & the role of different actors. Disruptive versus incremental innovation.
- Ideation, Intellectual Property creation and Innovation adoption lifecycle
- Systematization of new process, efficient exploitation of resources and material knowledge
- Development of innovative solutions at the construction site
- Large data and Artificial Intelligence in construction
- Innovative inspection methods and augmented reality in construction
- AI-assisted design, 3d printing and robotics-enabled construction
- Nature-based innovation in materials and methods
- Leveraging Technology to Increase operational productivity, quality & safety
- Life cycle assessment and circular economy
- Smart buildings
- Guest lectures from the Swiss ConstructionTech innovation ecosystem

Keywords

innovation, optimization, materials, productivity, environmental impact

Assessment methods

A project is executed by groups of 2-4 students with instructions from a lecturer. A production method, process or a building system, which is considered to possess a potential for development and improvement, is expected to be analyzed regarding quality, economy and environment. The project offers students a high degree of freedom and very much is depending on their initiative and creativity. Creativity sessions, interviews, and in some cases, construction of models or prototypes, are important parts. The aim is further that the students, if possible, shall develop and study these proposals in their final project, i. e. final thesis.

Supervision

Office hours	Yes
Assistants	Yes
Forum	Yes

Resources

Notes/Handbook

Program of Lectures available here: <https://enacshare.epfl.ch/dkyEhHPjSdc6znDfxu3gM>

Moodle Link

- <https://go.epfl.ch/CIVIL-424>