

ENV-422

Concepts in ecological engineering

Buttler Alexandre, Guillaume Thomas, Spiegelberger Thomas

Cursus	Sem.	Type
Environmental Sciences and Engineering	MA1, MA3	Opt.
Mineur STAS Russie	H	Opt.
Urban Planning and Territorial Development minor	H	Opt.

Language of teaching	English
Credits	4
Session	Winter
Semester	Fall
Exam	Oral
Workload	120h
Weeks	14
Hours	4 weekly
Courses	2 weekly
Project	2 weekly
Number of positions	

Summary

During this course students will learn the essential ecological concepts necessary to apply techniques of ecological engineering. While concepts are applicable worldwide, the outcome of ecological restoration depends on the local context; this transposition will be the scope of the semester project.

Content

The course is organised in three chapters.

- **Ecological Engineering**: principles & background (definition of EE, ecosystem goods and service, threats to biodiversity)
- **Ecological Concepts**: their application in EE (increasing community structures, ecological networks, metapopulation)
- **EE in selected ecosystems** (wetlands, forests, grasslands, agro-ecosystems, mountain ecosystems)

Keywords

Ecological engineering, planning, management, restoration

Learning Prerequisites**Required courses**

Ecologie générale (BA4), Sciences du sol (BA3), Microbiologie pour l'ingénieur (BA3)

Learning Outcomes

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

- Define ecological engineering (EE)
- Explain the main ecological concepts underlying EE
- Recognize key ecosystem characteristics necessary to apply techniques of EE
- Assess / Evaluate the quality of a scientific article
- Elaborate a report on a practical EE problem
- Apply ecological principals learnt in the course to real world problems
- Transpose general concepts to local problems
- Examine a scientific article

Transversal skills

- Access and evaluate appropriate sources of information.
- Make an oral presentation.
- Summarize an article or a technical report.
- Write a scientific or technical report.

Teaching methods

- Lecture ex cathedra
- Article presentation
- Semester project

Expected student activities

Students are expected to attend and participate the lectures, read and present a scientific article on concepts in ecological engineering, to do a semester project where you apply the principal topics learned during the lectures and write a report on the semester project.

Assessment methods

- 10 % for article presentation
- 40 % semester project
- 50 % oral examination (20 min)

Supervision

Office hours	No
Assistants	No
Forum	Yes
Others	Contact by email or skype

Resources

Bibliography

- Falk, D.A., M. Palmer, J. Zedler, and R.J. Hobbs. 2006. *Foundations of Restoration Ecology*. Island Press.
- Matlock, M.D., and R.A. Morgan. 2011. *Ecological Engineering Design: Restoring and Conserving Ecosystem Services*. Wiley.
- Smith, T.M., and R.L. Smith. 2012. *Elements of Ecology*. Always Learning. Pearson Benjamin Cummings.
- Townsend, C.R., M. Begon, and J.L. Harper. 2009. *Essentials of Ecology*. Wiley.
- Van Andel, J., and J. Aronson. 2012. *Restoration Ecology: The New Frontier*. Wiley.

Ressources en bibliothèque

- [Restoration Ecology/ Van Andel](#)
- [Elements of Ecology /Smith](#)
- [Foundations of Restoration Ecology / Falk](#)
- [Essentials of Ecology / Townsend](#)
- [Ecological Engineering Design / Matlock](#)

Moodle Link

- <http://moodle.epfl.ch/course/view.php?id=4621>

Prerequisite for

Master project