

ENV-103

Biology

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Cursus	Sem.	Type
Environmental Sciences and Engineering	BA2	Obl.

Language of teaching	English
Coefficient	6
Session	Summer
Semester	Spring
Exam	Written
Workload	180h
Weeks	14
Hours	6 weekly
Lecture	4 weekly
Exercises	2 weekly
Number of positions	

Summary

This course will cover the fundamental principles governing life and the living world. Topics will include the diversity of living organisms, cellular biology, genetics, evolution, and ecology. This course provides a foundation in biology, fostering critical thinking & analytical skills.

Content

Course topics include diversity of living organisms (eukaryotes and prokaryotes, viruses), cellular biology, different metabolisms (respiration, fermentation, photosynthesis), genetics, evolution, and ecology. A large part of the course will focus on these fundamental topics.

However, we will also explore the relationship between living organisms and the environment, emphasising how biological processes impact ecosystems and the natural world. Additionally, the course will focus on biodiversity and conservation, allowing future environmental engineers to balance the impact of human activities with ecosystem health and understand implications of biodiversity loss and climate change on ecosystems.

Students will also have an introduction to the role of microorganisms in environmental processes, such as bioremediation and nutrient cycling. Moreover, we will build a foundational basis in genetics and molecular biology related to environmental engineering, including genetic engineering and biotechnology applications in environmental remediation. The course aims to provide a solid foundation in biological concepts, fostering critical thinking and analytical skills for further studies in environmental sciences.

Keywords

Cells, metabolism, DNA, RNA, biodiversity, ecology, genetics

Learning Prerequisites**Required courses**

None

Learning Outcomes

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

- Describe ecological principles focusing on the interactions between organisms and their environments, ecosystem dynamics, and the impact of human activities on the ecological balance
- Classify the major biomolecules (proteins, nucleic acids, lipids) and their functions in the cell
- Examine genetics and evolution principles, understanding genetic inheritance, DNA processes, transcription, translation, and gain insight into the evolutionary mechanisms driving diversity of life
- Categorize the diversity of the living world and classify different organisms based on their unique characteristics and evolutionary relationships.

- Explain the different cellular metabolisms and energy production pathways, understanding key metabolic pathways like glycolysis, citric acid cycle, fermentation, photosynthesis
- Develop ethical awareness in the context of biology, environmental protection, conservation, understanding the ethical implications and importance of responsible decision-making in environmental engineering to promote sustainability and conservation efforts
- Contextualise biological knowledge in a real-world context, connecting biological principles to practical applications in agriculture, environmental conservation, and biotechnology.

Expected student activities

Lectures, exercises, discussion.
Quizzes to track learning progress.

Assessment methods

Written exam in the summer exam session.

Supervision

Office hours	Yes
Assistants	Yes
Forum	No

Resources

Bibliography

"Biology: a global approach" (Pearson, 12th edition, but older editions are fine as well)

Ressources en bibliothèque

- [Biology: a global approach / Campbell](#)

Moodle Link

- <https://go.epfl.ch/ENV-103>

Prerequisite for

ENV-202 Microbiology for engineers