

Course number		U-LAS61 10019 LE58					
Course title (and course title in English)		Introduction to Biogeochemistry-E2 Introduction to Biogeochemistry-E2		Instructor's name, job title, and department of affiliation		Graduate School of Agriculture Professor, Daniel Epron	
Group		Interdisciplinary Sciences		Field(Classification)		Environmental Sciences	
Language of instruction		English		Old group		Number of credits 2	
Number of weekly time blocks		1		Class style Lecture (Face-to-face course)		Year/semesters 2026 • First semester	
Days and periods		Mon.2		Target year Mainly 1st & 2nd year students		Eligible students For all majors	
[Overview and purpose of the course]							
Biogeochemistry studies the physical, chemical and biological processes that govern the exchanges of energy and matter between the biosphere, the atmosphere and the lithosphere. The course presents the main terrestrial biogeochemical cycles and discusses how natural processes influence them and how they are altered by anthropogenic disturbances. Particular attention will be paid to the global carbon cycle and the importance of soil organic matter in this cycle. This subject is on the border of physics, chemistry, biology, and earth science. It brings important concepts that form the basis of environmental science.							
[Course objectives]							
Upon successful completion of this course, students will be able (i) to understand the role of biological, chemical and physical processes in determining the fate of the major elements ecosystems and in the terrestrial biosphere, and (ii) to anticipate the effects of management practices on soil organic matter and inherent site fertility.							
[Course schedule and contents)]							
Course schedule: 1. Introduction to biogeochemistry: element reservoirs and fluxes 2. Biomass, primary production and net ecosystem production 3. Decomposition and mineralisation of organic matter. 4. Land use, land use change and soil organic matter 5. Production, emission and consumption of methane by soils and vegetation 6. Anthropogenic disturbances of major biogeochemical cycles: the global carbon cycle 7. Nutrient cycles and budget in terrestrial ecosystems 8. The biological cycle of nitrogen 9. Weathering and mineral alteration 10. Nutrient limitations and ecosystem fertility 11. Nutrients in aquatic ecosystems: oligotrophy and eutrophication 12. Anthropogenic disturbances of the global N and P cycles 13. Energy and water balances of terrestrial ecosystems 14. Human impact of the water cycle: the blue water / green water paradigm 15. End of Term Exam 16. Feedback							
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Introduction to Biogeochemistry-E2(2)

[Course requirements]

Beneficial but not mandatory: basic knowledges in biology and chemistry (high school)

[Evaluation methods and policy]

Grading: Quizzes or questions based on previous class contents (after each class on LMS, 50%), end of term exam (50%).

In no case will English language proficiency be a criterion for evaluating students. Tests and exams are designed to allow short answers.

Class attendance is expected: students who are absent more than three times without sound reasons (documented unavoidable absence) will not be credited.

[Textbooks]

Lecture notes and slides will be provided before each class (uploaded on LMS).

[References, etc.]

(References, etc.)

Chapin III FS, PA Matson, P Vitousek, P I. 『Principles of Terrestrial Ecosystem Ecology』 (Springer)
ISBN:978-1-4419-9503-2 (Recommended books to deepen the course content (not mandatory))

Schlesinger WH, Bernhardt ES 『Biogeochemistry: An Analysis of Global Change』 (Academic Press)
ISBN:978-0123858740 (Recommended books to deepen the course content (not mandatory))

[Study outside of class (preparation and review)]

Students are expected to review the course content of previous classes and to read the materials distributed before each class (about two hours between two classes).

[Other information (office hours, etc.)]

Students are encouraged to ask questions and to make comments during the class.

Students are welcome to arrange appointments by email, even outside the official office hour, for questions and discussion.

[Essential courses]