

Course number		U-LAS61 10020 LE14					
Course title (and course title in English)	Environmental Monitoring for Humanosphere-E2 :Introduction to Humanosphere			Instructor's name, job title, and department of affiliation	Research Institute for Sustainable Humanosphere Professor,Luce , Hubert		
	Environmental Monitoring for Humanosphere-E2 :Introduction to Humanosphere						
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	2025 • Second semester	
Days and periods	Fri.4		Target year	Mainly 1st & 2nd year students	Eligible students	For all majors	
[Overview and purpose of the course]							
<p>The development of human societies is increasingly contributing to the degradation of the environment and all ecosystems. In addition, population growth has increased human vulnerability to natural disasters, which are themselves exacerbated by human-induced climate change. To preserve the environment for future generations and safeguard human life, a comprehensive understanding of environmental conditions is essential, as emphasized by the United Nations Sustainable Development Goal 13 (Climate Action). Consequently, environmental monitoring - the observation and study of the environment - plays a vital role in addressing environmental challenges, promoting sustainable development, assessing risks, and warning populations in the event of natural disasters. This presentation will outline the basic aspects of environmental monitoring.</p>							
[Course objectives]							
<p>Students will gain knowledge of the concept of environmental monitoring. They will acquire basic concepts for implementing an environmental monitoring project. Through some examples, students will understand the importance of environmental monitoring to diagnose problems and alerts, and to help remedy them. They will also learn the basics of in situ and remote sensing measurements, the cornerstone of environmental monitoring, and the main international bodies dedicated to environmental monitoring. Environmental data will also be analyzed to illustrate the usefulness of this discipline.</p>							
[Course schedule and contents)]							
<p>1. (Weeks 1-2) What is Environmental Monitoring? - Definition and purpose - Importance to the humanosphere (protection and management) - General concepts of monitoring</p> <p>2. (Week 3) Examples of Environmental Monitoring - Climate monitoring - Air, water and soil quality monitoring - Biodiversity monitoring - Natural disaster monitoring</p>							
<div style="text-align: right;">Continue to Environmental Monitoring for Humanosphere-E2 :Introduction to Humanosphere(2)</div>							

3. (Week 4)

Some Key Parameters

- Physical and chemical parameters (e.g., pH, temperature)
- Major pollutants (e.g., CO₂, particulate matters, heavy metals)
- Biological indicators (e.g., indicator species)

4. (Weeks 5-7)

Methods and Techniques (principles and tools)

- In situ techniques
- Remote sensing techniques (active and passive)
- Data collection methodologies

6. (Week 8)

Technological Advances in Monitoring

- Platforms (e.g. balloons, aircraft, satellites)
- Automated monitoring ground stations
- Data analysis and modeling tools
- Emerging technologies (e.g., AI, machine learning)

6. (Week 9)

Data Management and Interpretation

- Importance of data quality control and reliability
- Tools for data analysis (e.g., GIS, statistical software)
- Dissemination of information

7. (Week 10-12)

Successful Examples of Environmental Monitoring

- Stratospheric ozone hole (problem identification and resolution)
- Acid rain (problem identification and resolution)
- Climate change: the role of environmental monitoring in identifying anthropogenic causes.

8. (Weeks 13-14)

Practical analysis of some environmental monitoring data.

- Identification of environmental problems (e.g. rise in CO₂ concentration) from databases.

9. (Week 15)

Final examination

10. (Week 16)

Feedback

[Course requirements]

This lecture only requires scientific backgrounds in natural sciences of high school levels.

[Evaluation methods and policy]

Evaluation will be:

Active participation in class: 20 pts
Assignments/projects at home: 40 pts
Final examination: 40 pts

[Textbooks]

Not used. Slide handouts will be distributed.

[References, etc.]

(**References, etc.**)

J. Artiola, I. L. Pepper, M. L. Brusseau 『Environmental Monitoring and Characterization』 (Elsevier Science & Technology Books, March 2004,) ISBN:0120644770

[Study outside of class (preparation and review)]

Course materials are made available prior to class.

Students are encouraged to study the materials before and after each session to pick up technical or uncommon words.

Depending on the topic, studying the materials and preparing the report for evaluation may take several hours per week.

[Other information (office hours, etc.)]

Materials (pdf files) are available on the KULASIS website. Email communication is available for questions outside of class time.