科目ナンバリング	U-LAS61 10020 LE14						
授業科目名<英訳>	Environmental Monitoring for Humanosphere-E2 :Introduction to Humanosphere Environmental Monitoring for Humanosphere-E2 :Introduction to Humanosphere			担当者所属職名・氏名	生存圏研究所 教授　Luce，Hubert		
群	統合科学科目群			分野(分類)	環境	使用言語	英語
旧群		単位数	2単位	週コマ数	1コマ	授業形態	講義（対面授業科目）
開講年度・開講期	2026・後期	曜時限	金4	配当学年	主として1・2回生	対象学生	全学向

[授業の概要・目的]

The rapid development of human societies has increasingly contributed to environmental degradation and the disruption of ecosystems. Moreover, population growth has increased human vulnerability to natural disasters, many of which are intensified by anthropogenic climate change. To safeguard the environment for future generations and protect human life, it is essential to understand environmental conditions in a systematic and scientific manner, an objective aligned with several of the United Nations Sustainable Development Goals (SDGs). Environmental monitoring (the systematic observation and study of the environment) plays a pivotal role in addressing environmental pressures, supporting sustainable development, assessing risks, and issuing early warnings in the event of natural disasters. This course introduces the fundamental principles, methods, and applications of environmental monitoring.

[到達目標]

By the end of this course, students will be able to:
- Understand the concept and scope of environmental monitoring.
- Identify the fundamental components required to design and implement an environmental monitoring project.
- Recognize the importance of environmental monitoring in diagnosing environmental problems, issuing alerts, and supporting remediation efforts.
- Comprehend the basic principles of in situ and remote sensing techniques, the core methods of environmental monitoring.
- Become familiar with major international organizations involved in environmental monitoring.
- Analyze and interpret environmental data based on an example to demonstrate the practical value of monitoring systems.

[授業計画と内容]

Weeks 1-2: Introduction to Environmental Monitoring
- Definition, purpose, and scope
- Importance for the humanosphere (protection, management, and sustainability)
- Key concepts and approaches to monitoring

Week 3: Examples of Environmental Monitoring
- Climate monitoring
- Air, water, and soil quality monitoring
- Biodiversity monitoring
- Natural disaster monitoring

Environmental Monitoring for Humanosphere-E2 :Introduction to Humanosphere(2)へ続く↓↓↓

Week 4: Key Environmental Parameters
- Physical and chemical parameters (e.g., temperature, pH)
- Major pollutants (e.g., CO2, particulate matter, heavy metals)
- Biological indicators (e.g., indicator species)

Weeks 5-7: Methods and Techniques
- In situ monitoring methods
- Remote sensing techniques (active and passive systems)
- Data collection and sampling methodologies

Week 8: Technological Advances in Monitoring
- Monitoring platforms (e.g., balloons, aircraft, satellites)
- Automated ground stations
- Data analysis and modeling tools
- Emerging technologies (AI, machine learning)

Week 9: Data Management and Interpretation
- Ensuring data quality, accuracy, and reliability
- Analytical tools (e.g., GIS, statistical software)
- Communication and dissemination of environmental information

Weeks 10-12: Case Studies of Environmental Monitoring
- Stratospheric ozone depletion: detection and global response
- Acid rain: monitoring and mitigation strategies
- Climate change: identifying anthropogenic drivers through monitoring

Weeks 13-14: Practical Data Analysis
- Analysis of environmental databases
- Identification of environmental trends (e.g., CO2 increase, temperature anomalies)
- Interpretation and presentation of findings

Week 15: Final Examination

Week 16: Feedback

[履修要件]

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

[成績評価の方法・観点]

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

[教科書]

Not used. Slide handouts will be distributed.

Environmental Monitoring for Humanosphere-E2 :Introduction to Humanosphere(3)へ続く↓↓↓

Environmental Monitoring for Humanosphere-E2 :Introduction to Humanosphere(3)

[参考書等]

（参考書）

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

[授業外学修（予習・復習）等]

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.

[その他（オフィスアワー等）]

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

[主要授業科目（学部・学科名）]