科目ナンバリング	U-LAS15 10008 LE58						
授業科目名<英訳>	How the Earth Works I-E2 :Environmental Change How the Earth Works I-E2 :Environmental Change			担当者所属職名・氏名	理学研究科　准教授　ENESCU, Bogdan Dumitru		
群	自然科学科目群			分野(分類)	地球科学(基礎)	使用言語	英語
旧群	B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・前期	曜時限	水4	配当学年	全回生	対象学生	全学向

[授業の概要・目的]

I will outline the environmental changes that have occurred during the Earth history, with a special focus on climate change. The lectures will address the main factors that control the climate, as well as their interaction. We will discuss in particular the human impact on environment and its consequences. To facilitate understanding and encourage active participation during the class, some materials and vocabulary in Japanese will be also provided.

[到達目標]

The Earth Climate is the result of complex interactions among the components that make up the Earth: the Atmosphere (layer of gases), the Hydrosphere (water), the Lithosphere (or solid Geosphere), and the Biosphere (all living organisms). By learning about these interactions that take place on a variety of time scales, the students will be able to understand why and how the Earth Climate continuously changes.

[授業計画と内容]

During its history of 4.6 billion years, the Earth climate changed profoundly. At the scale of hundreds of millions of years, the Earth is now during an "Ice Age" period. However, at a 'closer' look, at the scale of hundreds of thousands of years, we are at present in a period of relative warming known as "interglacial period". From the early part of the 19th century, the human activity started having a pronounced impact on climate, being likely responsible for the current "global warming", due to high emission of greenhouse gases.

Contents (tentative):
- Components of the climate system;
- Current global environment: the Earth's energy balance;
- Origins and evolution of the Atmosphere, Hydrosphere and Continents;
- Climate change factors: the carbon cycle;
- Long-term and short-term climate changes from past to present;
- 20th century warming: fingerprints of human-related global climate change.

There will be 2-3 lectures for each of the topics above. We will conduct in total 15 classes, including the feedback class.

[履修要件]

At the beginning of the course, you do not need specific knowledge of Earth Sciences. However, self-study is required to learn the essential knowledge necessary for the course.

How the Earth Works I-E2 :Environmental Change(2)へ続く↓↓↓

How the Earth Works I-E2 :Environmental Change(2)

[成績評価の方法・観点]

Evaluation will be based on class attendance and active participation (30%), class-room exercises (30%) and a final examination (40%).

[教科書]

A pack of class materials (mainly PowerPoint files) will be provided to students. The following textbook is recommended, but not required:
Lee R. Kump, James F. Kasting and Robert G. Crane, The Earth System (3rd edition), Prentice Hall, ISBN: 978-0321597793, 2009.

[参考書等]

（参考書）
John P. Grotzinger and Thomas H. Jordan 『Understanding Earth (7th edition)』（W.H. Freeman and Company）ISBN:978-1-4641-3874-4

[授業外学修（予習・復習）等]

Students will be expected to do readings in preparation for the class. Class-related materials should be downloaded and printed out by students, from a dedicated website, which will be announced at the beginning of the lecture.

[その他（オフィスアワー等）]

Students can meet me during office hours with prior appointment. The number of students who can take this class will be limited to a maximum of 60 students.

[主要授業科目（学部・学科名）]