

Course number		U-LAS15 10002 LE58					
Course title (and course title in English)		Introduction to Earth Science A Introduction to Earth Science A		Instructor's name, job title, and department of affiliation		Graduate School of Engineering Associate Professor,Zhu Fan	
Group	Natural Sciences		Field(Classification)		Earth Science(Foundations)		
Language of instruction	English		Old group	Group B		Number of credits	2
Number of weekly time blocks	1	Class style	Lecture (Face-to-face course)		Year/semesters	2025 • First semester	
Days and periods	Fri.1	Target year	Mainly 1st year students		Eligible students	For science students	
[Overview and purpose of the course]							
Year after year, the effects of climate change (extreme heat waves, rising sea-levels, changes in patterns of precipitation, floods, droughts, intense hurricanes, etc.) are increasingly affecting--directly and indirectly--the physical, social, and psychological health of humans. As a student of sciences, you will be responsible--at some point of your future professional career, be it in the public or private sector--to device strategies, methods, and/or techniques to mitigate its effects, either globally or locally. But, in order to do so, you first need to understand how our planet works, how its diverse parts are interrelated, and how changes in the working of some of its elements could disrupt complete systems. This lecture will introduce, therefore, the tools needed to study the Earth as a system, and will focus on three of its main subsystems (Atmosphere, Hydrosphere, and Geosphere) and their interactions in different time scales.							
[Course objectives]							
At the end of the semester, you should be able to understand the concept of systems, the basics of our planet's energy balance, and also the principles behind of the behavior--as systems and subsystems--of the Atmosphere, the Hydrosphere, and the Geosphere.							
[Course schedule and contents)]							
This course consists of 15 classes including one feedback class. The classes will be grouped into several topics. Each topic will be taught in two or three lectures as listed below: 1. Introduction to Earth Systems (2 sessions) Coupling and feedback loops in the Earth system. 2. Global Energy Balance (3 sessions) The greenhouse effect, umbrella effect, and climate change. 3. Atmosphere (3 sessions) Circulation of the atmosphere and precipitation. 4. Hydrosphere (3 sessions) Seawater properties, surface currents and deep ocean currents.							
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5. Geosphere (3 sessions)
Anatomy of Earth and plate tectonics.

6. Feedback (1 session)

[Course requirements]

None

[Evaluation methods and policy]

Evaluation will be based on class attendance and participation (20%), in-class exercise and homework (30%) and a final report (50%). This class will have no mid-term or final exam. Submission of a final report is necessary for this class. Detailed requirements on the report will be explained during the lectures.

[Textbooks]

Handouts will be provided for each class.

[References, etc.]

(References, etc.)

Lee R. Kump, James F. Kasting, Robert G. Crane 『The Earth System』 ISBN:9780321597793

Brian J. Skinner, Barbara Murck 『The Blue Planet : An Introduction to Earth System Science』 ISBN: 9780471236436

Frederick K. Lutgens, Edward J. Tarbuck 『The Atmosphere : An Introduction to Meteorology』 ISBN: 9780321756312

Edward J. Tarbuck, Frederick K. Lutgens 『Earth : An Introduction to Physical Geology』 ISBN: 9780321814067

All additional reference books are available at the Library in Yoshida Campus, and also at other Kyoto University libraries. Previous editions of the same books can also be used.

[Study outside of class (preparation and review)]

Handouts will be provided at the beginning of each session. You are expected to use them to follow the lectures, to take notes, and as a starting point to further your personal self-learning.

Before end of the semester you will be requested to submit a report summarizing the topics studied in class. Writing the report may also require doing additional research on the recommended bibliography or other resources.

[Other information (office hours, etc.)]

Information will be provided during the first lecture.