

Hokkaido University Syllabus					
<div> <div></div> <div>Course Title</div> </div>					
Environmental Geology II					
<div> <div></div> <div>Subtitle</div> </div>					
<div> <div></div> <div>Instructor (Institution)</div> </div>					
Tsubasa OTAKE(Graduate School of Engineering)					
<div> <div></div> <div>Other Instructors (Institution)</div> </div>					
Tsubasa OTAKE(Graduate School of Engineering)					
<div> <div></div> <div>Course Type</div> </div>				<div> <div></div> <div>Open To Other Faculties / Schools</div> </div>	OK
<div> <div></div> <div>Year</div> </div>	2018	<div> <div></div> <div>Semester</div> </div>	1st Semester (Summer Term)	<div> <div></div> <div>Course Number</div> </div>	
<div> <div></div> <div>Type of Class</div> </div>	Lecture	<div> <div></div> <div>Number of Credits</div> </div>	2	<div> <div></div> <div>Year of Eligible Students</div> </div>	~
<div> <div></div> <div>Eligible Department / Class</div> </div>				<div> <div></div> <div>Other Information</div> </div>	
<div> <div></div> <div>Numbering Code</div> </div>	ENG_SRE 5201				
<div> <div></div> <div>Major Category Code</div> </div>	<div> <div></div> <div>Major Category Title</div> </div>				
ENG_SRE	Engineering_Sustainable Resources Engineering				
<div> <div></div> <div>Level Code</div> </div>	<div> <div></div> <div>Level</div> </div>				
5	Specialized Subjects (basics) in graduate level (Master's Course and Professional Course), Inter-Graduate School Classes				
<div> <div></div> <div>Middle Category Code</div> </div>	<div> <div></div> <div>Middle Category Title</div> </div>				
2					
<div> <div></div> <div>Small Category Code</div> </div>	<div> <div></div> <div>Small Category Title</div> </div>				
0					
<div> <div></div> <div>Language Type</div> </div>					
Classes are in English.					

Key Words

Concentration of elements, Ore deposits, Material transfer, Earth's surface environment

Course Objectives

Mineral and energy resources that we mine and use today were concentrated on the Earth's surface as results of various interactions in natural systems (e.g., magma-rock, water-mineral, life-mineral, life-atmosphere). We need to understand the formation processes of ore deposits and geological and geochemical factors controlling the concentration of elements for exploring ore deposits and evaluating the economic potential. On the other hand, mining and use of various resources also potentially cause various environmental and waste disposal issues. To resolve these issues, we need to understand geological and geochemical conditions for mobility of elements on the Earth's surface. The goals of the class are (1) to learn about fundamental knowledge regarding mechanisms of elements and materials, physical chemistry of material transportation and (2) to understand concept of geochemical cycling on Earth and fundamental concept of Environmental Geology and their significances.

Course Goals

- (1) To understand describe geological and geochemical characteristics of rocks that are concentrated in particular elements.
- (2) To understand physical chemical processes for mobilization of elements in the lithosphere, hydrosphere, and biosphere on Earth
- (3) To understand the significance of biosphere on Earth system and their coevolution throughout geologic history.

Course Schedule

1. Natural Resources and the Environment (1 class)
  - To discuss on the relationship between Earth resources and our life, and environmental impact to the use of Earth resources.
  - To understand the importance of Geology and Geochemistry to resolve issues associated with using Earth resources.
2. The formation processes of ore deposits (4 classes)
  - To learn about geological and geochemical processes involving the formation of ore deposits.
  - To discuss about the origin of ore deposits and their uneven distributions in the world.
3. Contamination of hazardous elements (1 classes)
  - To learn about environmental impact by using natural resources and mining developments
  - To understand role of geology and geochemistry for efficient waste disposal.
4. Constituents of Earth's surface and mobilization of elements (4 classes)
  - To understand principles of physical chemistry relating to mobilization of elements (e.g., dissolution/precipitation of minerals, adsorption of ions onto minerals, diffusion, advection).
5. Analytical tools for Geological Engineering (3 classes)
  - To learn about geochemical tools (e.g., geochemical modeling, isotopes) for investigating reactions/transport of materials, as well as origins/ages for the formation of minerals/rocks.
6. Coevolution of biosphere and Earth's surface environments (2 classes)
  - To understand the concept of Earth system science, and effect of biosphere to Earth system.
  - To understand evolution of interaction between biosphere and Earth system throughout geologic history, and impact of human activity to Earth system.

Homework

Reading a chapter of "Earth Resources and the Environments" by Craig, J. R. et al., 2011.

#### ■ ■ Grading System

Grades are determined based on Quiz (60%) and Report (40%)

#### ■ ■ Textbooks

[Earth Resources and the Environments, 4th edition / Craig, J.R., Vaughan, D.J., and Skinner, B.J. : Prentice Hall, 2011, ISBN:0321676483](#)

#### ■ ■ Reading List

[Earth Resources and the Environments, 4th edition / Craig, J.R., Vaughan, D.J., and Skinner, B.J. : Prentice Hall, 2011, ISBN:0321676483](#)  
[The Geochemistry of Natural Waters: Surface and groundwater environments / Drever, J.I. : Prentice Hall, 1997, ISBN:978-0132727907](#)

#### ■ ■ Websites

#### ■ ■ Website of Laboratory

<http://eg-hokudai.com>

#### ■ ■ Additional Information

#### ■ ■ Update

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