

科目ナンバリング		U-LAS15 20011 LE58									
授業科目名 <英訳>		Introduction to Mineral Resources-E2 Introduction to mineral resources-E2				担当者所属 職名・氏名		エネルギー科学研究科 准教授 AU Ka Man			
群	自然科学科目群			分野(分類)	地球科学(発展)			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	2024・後期		曜時限	木4		配当学年	主として1・2年生	対象学生	理系向		
【授業の概要・目的】											
Minerals are important for society to function, but it is useful to know how they are formed, extracted and converted into useful products. This course will introduce students to earth sciences, with a focus on mineral resources, as well as looking at how these resources are converted into useful materials and what wastes are produced in the process. We will focus on how minerals can be considered "critical" to society now and in the future.											
【到達目標】											
From this course the students will be expected to know how mineral resources are situated geologically, how they are measured, how mining and minerals processing leads to final products that are used in society and what the implications of the extraction of minerals are for the environment.											
【授業計画と内容】											
This course will cover the following topics: Week 1 - 4 (Basics of Geology and Earth Sciences with a focus on mineral resources) 1. Introduction to earth sciences and the importance for minerals resources 2. Geology and the lithosphere - geological time and formations 3. Processes of rock and mineral formation 4. Mineralogy Week 5-14 (Minerals resources and their extraction, transformation into mineral products) 5. Reserves, resources, geological uncertainty and economics 6. Mineral deposits and mining 7. Beneficiation of ore and minerals processing - general considerations 8. Manufacturing mineral products - general considerations 9. Critical minerals methodologies 10. Critical minerals case study 1 - Rare earths / rare metals 11. Critical minerals case study 2 - Base metals 12. Waste, recycling and environmental impacts 13. Social impacts of minerals - Dutch disease and conflict 14. Future mining - what comes next? Each of the above topics covers 1-2 weeks, with one class per week. The course overall consists of 14 classes and one feedback session.											
【履修要件】											
特になし											
【成績評価の方法・観点】											
The course will be assessed based on: 1. class participation (30%)											

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Introduction to Mineral Resources-E2(2)

- 2. small exercises (20%)
- 3. final presentation (10%)
- 4. final assignment (40%)

Scores will be given on a scale of 0-100.

[教科書]

使用しない

[参考書等]

(参考書)

Edward J. Tarbuck, Frederick K. Lutgens, Dennis G Tasa; 2011 『Earth Science (13th Edition)』
Graham R. Thompson, Jon Turk; 2009 『Earth Science and the Environment (4th edition)』
Jeremy.P. Richards, 2009 『Mining, society and a sustainable world』
Georgius Agricola 『De Re Metallica』 (<https://www.gutenberg.org/files/38015/38015-h/38015-h.htm>)
M. King Hubbert 『Hubbert Curves (Peak Oil)』 (<https://web.archive.org/web/20080527233843/http://www.hubbertpeak.com/hubbert/1956/1956.pdf>)
Jevons 『The Coal Question』 (<https://oll.libertyfund.org/titles/jevons-the-coal-question>)
Gus Gunn 『Critical Metals Handbook』
W.J. Rankin, 2011 『Minerals, metals and sustainability』 (Textbook is not necessary, but is a useful reference and will be referred to in class.)

(関連URL)

[https://www.iied.org/mining-minerals-sustainable-development-mmsd\(Mining, Minerals and Sustainable Development\)](https://www.iied.org/mining-minerals-sustainable-development-mmsd(Mining, Minerals and Sustainable Development))
[https://www.resourcepanel.org/reports/mineral-resource-governance-21st-century\(Mineral Resource Governance in the 21st Century\)](https://www.resourcepanel.org/reports/mineral-resource-governance-21st-century(Mineral Resource Governance in the 21st Century))
[https://www.undp.org/content/undp/en/home/librarypage/poverty-reduction/Managing-Mining-for-SD.html\(Managing Mining for Sustainable Development\)](https://www.undp.org/content/undp/en/home/librarypage/poverty-reduction/Managing-Mining-for-SD.html(Managing Mining for Sustainable Development))

[授業外学修 (予習・復習) 等]

Class materials will be loaded on Panda and pre-reading may be required.

Final assessment is typically a report, which will require a number of hours for research and writing.

[その他 (オフィスアワー等)]

Consultation is available by prior arrangement.