

科目ナンバリング		U-LAS12 10031 LE57							
授業科目名 <英訳>	Fundamentals of Materials I-E2 Fundamentals of Materials I-E2				担当者所属 職名・氏名	工学研究科 准教授 GAO, Si			
群	自然科学科目群			分野(分類)	物理学(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	木2		配当学年	主として1・2回生	対象学生	理系向
<b>[授業の概要・目的]</b>									
This is the first half of a two-semester course Fundamentals of Materials. The purpose of this course is to give a concise but comprehensive introduction covering all major classes of materials to the students majored in physical engineering. The characteristics of all main classes of materials - metals, polymers and ceramics, as well as their physical properties, are explained with reference to real-world examples. In the first semester we will firstly introduce the elements and atomic structure, and then mainly focus on the structure and mechanical properties of metallic materials.									
<b>[到達目標]</b>									
Students are expected to have a broad understanding of fundamental aspects of metallic materials, such as atomic microstructure, microstructures and mechanical properties of metallic materials by taking this course.									
<b>[授業計画と内容]</b>									
Week 1. Introduction to materials and materials science Week 2. Atomic structure and interatomic bonding Week 3. Structure of crystalline solids Week 4-5. Imperfections in solids Week 5. Diffusion Week 6-7. Mechanical properties of metals Week 8. Strengthening mechanisms in crystalline materials Week 9. Failure of materials Week 10. Phase diagrams Week 11. Phase transformations Week 12-13. Engineering alloys Week 14. Characterization techniques of the materials									
A total of 14 lectures and one feedback class will be given.									
<b>[履修要件]</b>									
特になし									
<b>[成績評価の方法・観点]</b>									
Attendance and class participation [60%] Homework assignments [40%]									
<b>[教科書]</b>									
使用しない									
<b>[参考書等]</b>									
(参考書) William D. Callister, David G. Rethwisch, 『Materials Science and Engineering: An Introduction』 (John Wiley & Sons Inc.) ISBN: 1118319222									
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### [授業外学修（予習・復習）等]

Assignment (Quiz) are set for the review after class. The necessary time for assignments is around 1.5 hours for each class.

### [その他（オフィスアワー等）]

### [主要授業科目（学部・学科名）]