科目ナンバリング	U-LAS70 10002 SE50						
授業科目名<英訳>	ILAS Seminar-E2 :A stroll around materials chemistry - Superconducting materials（材料化学の散歩道 - 超伝導体） ILAS Seminar-E2 :A stroll around materials chemistry - Superconducting materials			担当者所属職名・氏名	工学研究科　准教授　Yi Wei		
群	少人数群	単位数	2単位	週コマ数	1コマ	授業形態	ゼミナール（対面授業科目）
開講年度・開講期	2026・前期	受講定員(1回生定員)	15 (15) 人	配当学年	主として1回生	対象学生	全学向
曜時限	水5	教室	1共21			使用言語	英語
キーワード	Zero resistivity / Flux repulsion / Electrons pair / Critical phenomena / Superconducting magnet						

[授業の概要・目的]

Amazing superconducting materials are one kind of substance exhibiting zero electrical resistance and magnetic exclusion at certain conditions. They can be metals, ceramics, or organic materials. This course will introduce the superconducting properties (including discovery, phenomena, elementary properties), superconducting materials (conventional and high temperature superconductor), and superconductor applications. It is intended to equip students with a basic understanding of superconductivity, characteristics of various superconductors and advantage of applications. It also aims to encourage students to do active conversation about scientific concept in English.

[到達目標]

This course aims to equip students with a basic understanding of the superconducting materials. By the end of this course, students will: (1) Understanding the fundamental phenomena and features of superconductors. (2) Explain the basic superconductivity in qualitative terms. (3) Recognize major superconducting materials and their applications. (4) Discuss current challenges and future directions in the field.

[授業計画と内容]

The number of lectures as shown in【】.

1.Discovery & Fundamentals【2】
Magic of superconductivity
Discovery & exploration
Classification

3.Phenomena & interpretation【5】
Zero resistance & perfect conductivity
Magnetic flux repulsion & penetration
Critical magnetic field
Electrons pairing & tunnelling
Superconductivity at high temperature

4.Superconducting materials【4】
Elements and alloys
Cu-based oxides

Fe-based compounds
Hydrides
Characterization techniques

5.Applications & frontiers【3】
Superconducting magnet
Sensitive magnetic detector
Energy storage and transmission

6.Feedback【1】

[履修要件]

特になし

[成績評価の方法・観点]

Class attendance and participation (60%)
Homework(20%)
Presentation and discussion(20%)

[教科書]

使用しない
Handouts will be provided as necessary

[参考書等]

（参考書）
授業中に紹介する

[授業外学修（予習・復習）等]

Students are expected to participate in the conversations and presentations in class. Their own laptops (or iPad, smartphone, etc.) can be used to search for references and information during discussion sessions. It is around one hour to complete the assignments after class.

[その他（オフィスアワー等）]

[主要授業科目（学部・学科名）]