Course number	U-LAS70 10002 SE50				
Course title (and course title in English)	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	**Instructor's name, job title, and department of affiliation**	Graduate School of Engineering Associate Professor,Yi Wei		
Group	Seminars in Liberal Arts and Sciences	**Number of credits**	2	**Number of weekly time blocks**	1
Class style	seminar (Face-to-face course)	**Year/semesters**	2025・First semester	**Quota (Freshman)**	15 (15)
Target year	Mainly 1st year students	**Eligible students**	For all majors	**Days and periods**	Thu.5
Classroom	21, Yoshida-South Campus Bldg. No. 1			**Language of instruction**	English
Keyword	Zero resistivity / Magnetic flux repulsion / Superconducting electron pair / Type-II superconductor / Superconducting magnet				

[Overview and purpose of the course]

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.

[Course objectives]

This course aims to equip students with a basic understanding of the superconducting materials, including superconducting properties, phenomena, basic interpretations and applications. The classifications and characteristics of various types of superconductors will be comprehended.

[Course schedule and contents)]

The number of lectures as shown in【】.
1.Discovery and development【1】

2.Basic characteristics of superconductor【2】
Zero electrical resistance
Perfect diamagnetism

3.Superconducting phenomena and interpretation【5】
Critical phenomena in superconductor
Flux quantization and flux pinning
Tunneling effect of supercurrent
Superconducting phase transition
Pairing electrons

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4.superconducting materials【3】
Elements and alloys superconductors
Cu-based high-temperature superconductors
Fe-based superconductors
Superconductors under pressure

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

6.Feedback【1】

[Course requirements]

None

[Evaluation methods and policy]

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

[Textbooks]

Not used
Handouts will be provided as necessary

[References, etc.]

（References, etc.）
Introduced during class

[Study outside of class (preparation and review)]

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 in class. It is around one hour to complete the assignments after class.

[Other information (office hours, etc.)]

[Essential courses]