

Course number		U-LAS70 10002 SE50				
Course title (and course title in English)	ILAS Seminar-E2 :Applying Data Science to Healthcare - Novel Approaches in Modern Epidemiology ( データサイエンスで見る医療 - 進化している疫学の新たなアプローチ )		Instructor's name, job title, and department of affiliation	Graduate School of Medicine Assistant Professor,LUO YAN		
	ILAS Seminar-E2 :Applying Data Science to Healthcare - Novel Approaches in Modern Epidemiology					
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	2024 ・ Second semester		Quota (Freshman)	12 (8)
Target year	Mainly 1st year students	Eligible students	For all majors		Days and periods	Wed.5
Classroom	23, Yoshida-South Campus Academic Center Bldg. North Wing				Language of instruction	English
Keyword	Healthcare / Epidemiology / Evidence-based medicine / Data science					
[Overview and purpose of the course]						
Epidemiology studies of the patterns and determinants of health-related conditions in a defined population. With the great advancements in data science in recent years, epidemiology has evolved and adopted new approaches to tackle unresolved issues. This seminar will begin with the fundamentals of traditional epidemiology and explore how data science is helping improve healthcare. Potential topics include machine learning methods used in clinical research, causal inference, clinical trial/epidemiological study designs, and evidence synthesis (students can vote for topics of their interest). Real-world examples will be used for demonstration. Students are encouraged to actively participate in discussions, presentations, and practice simple analyses on statistical software.						
[Course objectives]						
To learn about data science methods that are applied to modern epidemiology. To gain a basic understanding of the mechanism, benefits and drawbacks of each approach, as well as how to conduct simple analyses. To understand how data science can improve healthcare and how it may be misinterpreted. To enhance problem-solving abilities and critical thinking skills.						
[Course schedule and contents])						
In principle, the course will be offered according to the following plan. The order and content may be subject to slight changes.						
Week 1: Introduction and overview Week 2: Basics of epidemiology Week 3-6: Machine learning methods that are used in clinical research (linear/logistic and nonlinear regression, penalization methods, KNN, decision tree, random forest, SVM, etc.) Week 7-9: Causal inference Week 10-12: Clinical trial & Epidemiological study design						
----- Continue to ILAS Seminar-E2 :Applying Data Science to Healthcare- Novel Approaches in Modern Epidemiology (データサイエンスで見る医療 - 進化している疫学の新たなアプローチ) (4)						

Week 13-15: Evidence synthesis methods

Week 16: Feedback

### **[Course requirements]**

Analysis practice will utilize the statistical software R.

### **[Evaluation methods and policy]**

Attendance and active participation - 50%

Presentation - 30%

Final assessment - 20%

### **[Textbooks]**

No textbook will be used. Materials will be provided in class or on PandA.

### **[References, etc.]**

( References, etc. )

Materials will be provided in class or on PandA.

### **[Study outside of class (preparation and review)]**

Students are expected to prepare for group or individual short presentations after some lectures.

### **[Other information (office hours, etc.)]**

Students may ask questions or request to schedule an in-person appointment via email.