Course number	U-LAS11 20005 SE55		
Course title (and course title in English)	Data Analysis Practice I-E2 Data Analysis Practice I-E2	Instructor's name, job title, and department of affiliation	Graduate School of Pharmaceutical Sciences Associate Professor,Martin Robert
Group	Natural Sciences	Field(Classification)	Data Science(Development)
Language of instruction	English	Old group	Group B
Number of credits	2		
Number of weekly time blocks	1	Class style	Seminar (Face-to-face course)
Year/semesters	2025・First semester		
Days and periods	Wed.4	Target year	All students
Eligible students	For all majors		

[Overview and purpose of the course]

The world around us, is filled with numbers (data) that range over many scales of space and time and that describe its organization. In biology, traditionally, data feature parts lists and partial views of the connections between those parts. However, there is also a vast amount of quantitative (numerical data) that is accumulating, whether from sequences of DNA, concentrations of various biomolecules, or other types of data.

The ability to handle, process, explore, and visualize data are important skills for all students. While in this course many examples will be derived from biology, the mindset and basic analysis workflows are widely applicable in any domain of science, engineering and beyond.

In this course you will learn how to use R, RStudio, and the Tidyverse packages to clean, process, manipulate, explore, and visualize data.

[Course objectives]

By the end to this course participants should be able to:
- Perform basic data processing and analysis using R
- Find and describe different forms of (biological) data
- Elaborate specific questions about the data
- Clean and process raw data
- Transform data
- Draw various types of plots to interpret from its results
- Gain insight into data
- Develop analysis workflows
- Effectively communicate the results of data analysis

[Course schedule and contents)]

Week 1 Guidance and introduction
Week 2 What is data? Getting started with R
Week 3 Workflow demonstration
Week 4-5 Importing and cleaning up data
Week 6-7 Data transformation
Week 8 Data visualization
Week 9 Digging deeper into R using dplyr

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Data Analysis Practice I-E2(2)

Week 10 Dealing with specific data (strings, dates, etc.)
Week 11 Getting to grips with ggplot - producing publication-quality figures
Week 12 Working with single variables
Week 13 Exploring relationships among variables
Week 14 Looking back and looking forward
Week 16 Feedback

[Course requirements]

This course is for beginners in data analysis and R and there is no specific science or math requirement.

Students should bring a computer to class to complete in-class exercises and tutorials as well as homework assignments.

[Evaluation methods and policy]

20 % Class attendance/ participation
60 % In-class exercises and homework assignments
20 % Project and presentation

[Textbooks]

Owen L. Petchey, Andrew P. Beckerman, Natalie Cooper, and Dylan Z. Childs 『Insights from Data with R : An Introduction for the Life and Environmental Sciences』 （Oxford University Press USA, 2021）
The textbook listed above will be the main resource for the course but students are not required to buy it. Kyoto University Library has some digital license available.

[References, etc.]

（References, etc.）
Wickham and Grolemund 『R for data science』 （O'Reilly Media, 2017）

[Study outside of class (preparation and review)]

Out of class activities will mainly be for assigned readings and homework assignments and for working on a project. Students should expect to spend about 1-2 hours per week preparing for the class and completing assignments.

[Other information (office hours, etc.)]

Announced during class.