Course number	U-LAS70 10002 SE50				
Course title (and course title in English)	ILAS Seminar-E2 :Computer simulations in Biology（生物学におけるコンピュータシミュレーション） ILAS Seminar-E2 :Computer simulations in Biology	Instructor's name, job title, and department of affiliation	Graduate School of Science Senior Lecturer,BRANDANI, Giovanni・Bruno		
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	Wed.5
Classroom	25, Yoshida-South Campus Bldg. No. 4			Language of instruction	English
Keyword	computer simulations / Python / numerical methods / reaction kinetics / gene expression				

[Overview and purpose of the course]

Computer simulations play an important role in the process of scientific discovery, complementing theory and experiments. In this seminar course, the students will learn how to code computer simulations in Python to investigate problems of great biological interest. For example, we will study how populations of prey and predators change over time in a given ecological system, understand how bacteria search for food around their environment, and predict the spread of epidemics. The course is structured as a series of tutorials (as Jupyter notebooks) where students implement a model for a given biological system and run simulations to learn more about it. In the final project, students will investigate a problem of choice, and present their results for the final evaluation.

[Course objectives]

To be able to program computer simulations using the Python programming language.
To understand how models are routinely used to in biology.
To learn about the process of scientific discovery: how to ask your own questions and design your own "computer experiments" to give an answer.

[Course schedule and contents)]

Schedule (may be subject to change, some topics are covered in multiple classes):
- Introduction to the course
- Programming in Python
- Chemical kinetics
- Predator-prey population dynamics
- Epidemiology
- Final project

(Total:14 classes and 1 feedback)

Continue to ILAS Seminar-E2 :Computer simulations in Biology（生物学におけるコンピュータシミュレーション）(2)↓↓↓

ILAS Seminar-E2 :Computer simulations in Biology (生物学におけるコンピュータシミュレーション) (2)

[Course requirements]

Course open to all students. In order to practice with coding, each student should work on a laptop during classes.

[Evaluation methods and policy]

Class attendance and active participation (50%), final project and oral presentation (50%)

[Textbooks]

Handouts will be provided.

[Study outside of class (preparation and review)]

If conditions permit it, in one or more occasions students will be divided into small groups to work together on a project.

[Other information (office hours, etc.)]

Please feel free to come to my office at any time, or to send an email to brandani@biophys.kyoto-u.ac.jp

[Essential courses]