科目ナンバリング	U-LAS70 10002 SE50						
授業科目名<英訳>	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			担当者所属職名・氏名	理学研究科　講師　BRANDANI, Giovanni・Bruno		
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)	20 (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	4共25			使用言語	英語
キーワード	computer simulations / Python / numerical methods / reaction kinetics / gene expression						

[授業の概要・目的]

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.

[到達目標]

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.

[授業計画と内容]

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)

[履修要件]

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

[成績評価の方法・観点]

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

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）(2/2)続く↓↓↓

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)

[教科書]

Handouts will be provided.

[授業外学修（予習・復習）等]

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

[その他（オフィスアワー等）]

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

[主要授業科目（学部・学科名）]