科目ナンバリング	U-LAS70 10001 SJ50						
授業科目名 <英訳>	ILASセミナー：パイソンによる科学現象の可視化 ILAS Seminar :Visualising Science with Python			担当者所属 職名・氏名	高等研究院　特定助教 MATTONI, Giordano		
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	2025・前期	受講定員 (1回生定員)	15 (15) 人	配当学年	主として1回生	対象学生	全学向
曜時限	火5	教室	1共01			使用言語	英語
キーワード	science / Python / data / analysis / program						

[授業の概要・目的]

This is a practical course with the aim of learning how to make scientific data visible to the human eye. Scientific information often takes the form of written numbers or text that do not have a clear meaning for humans. With a series of hands-on lessons, students will learn how to use Python, a powerful tool and programming language, to make science visible, analyse it, and interpret it. Lessons will be highly interactive, with students required to write their own examples and immediately test what taught in the class. Students will be encouraged to get independent at finding their own resources on the Internet and develop critical scientific thinking.

[到達目標]

- Display scientific data in an effective manner (graphs, labels, pointers)
- Learn the basics of Python programming language
- Interpret data based on mathematical models, critical thinking
- Set up a simple scientific experiment with common tools
- Find own resources by Internet search

[授業計画と内容]

このセミナーは、主に英語で行われるが、E2科目として認められないことに注意すること。

Module I: The basics of data plotting
1. Introduction to the course and Python language, installation on own computers
2. Spyder editor, structure of variables, operators, print function
3. Inputs and functions, IF/FOR loops
4. Loading data, function plotting with matplotlib
5. Multiple curves/plots/labels/zooming

Assignment I: Plot given data highlighting its interpretation (20pts + 5/3/1pts for top three students)

Module II: Data analysis
6. Interactive plots and manual fits
7. Data fitting with numpy/complex functions
8. Interpolation and data matching from different sets
9. Data filtering, background subtraction
10. Data digitiser: test model from a published scientific article

Assignment II: Re-plot data from given scientific article and test models (20pts + 5/3/1pts for top three

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students)

Module III: Applied science and daily life
11. Parse and plot data from a website
12. Set-up a simple scientific experiment such as pendulum swing, resistivity of a superconductor, light intensity (to be decided according to group size and student interest)
13. Perform measurements with common instruments (i.e., smartphone, voltmeter)
14. Acquire scientific data

15. Final exam: Analysis of data, fitting with a model, interpretation of results (60pts)
16. Feedback class

[履修要件]

Students are required to bring their own laptops to the lessons and exam. If you do not have a laptop and would like to borrow one for the lessons, please contact the teacher directly.
Active participation is encouraged to develop problem-solving skills and independence.
Basic knowledge of programming can be helpful, but not required.

[成績評価の方法・観点]

Students will be evaluated based on the assignment I and II (20pts each) and a final in-class examination (60pts). At least 60pts are required to pass this course.

[教科書]

No textbooks. In addition to the material provided in the class, students are encouraged to find their own resources by Internet search.

[参考書等]

（参考書）
授業中に紹介する

[授業外学修（予習・復習）等]

One of the objectives of this course is for students to learn to search their own material online (guidelines will be provided in the class).

[その他（オフィスアワー等）]

Flexible office hours (schedule to be discussed in the class).

[主要授業科目（学部・学科名）]