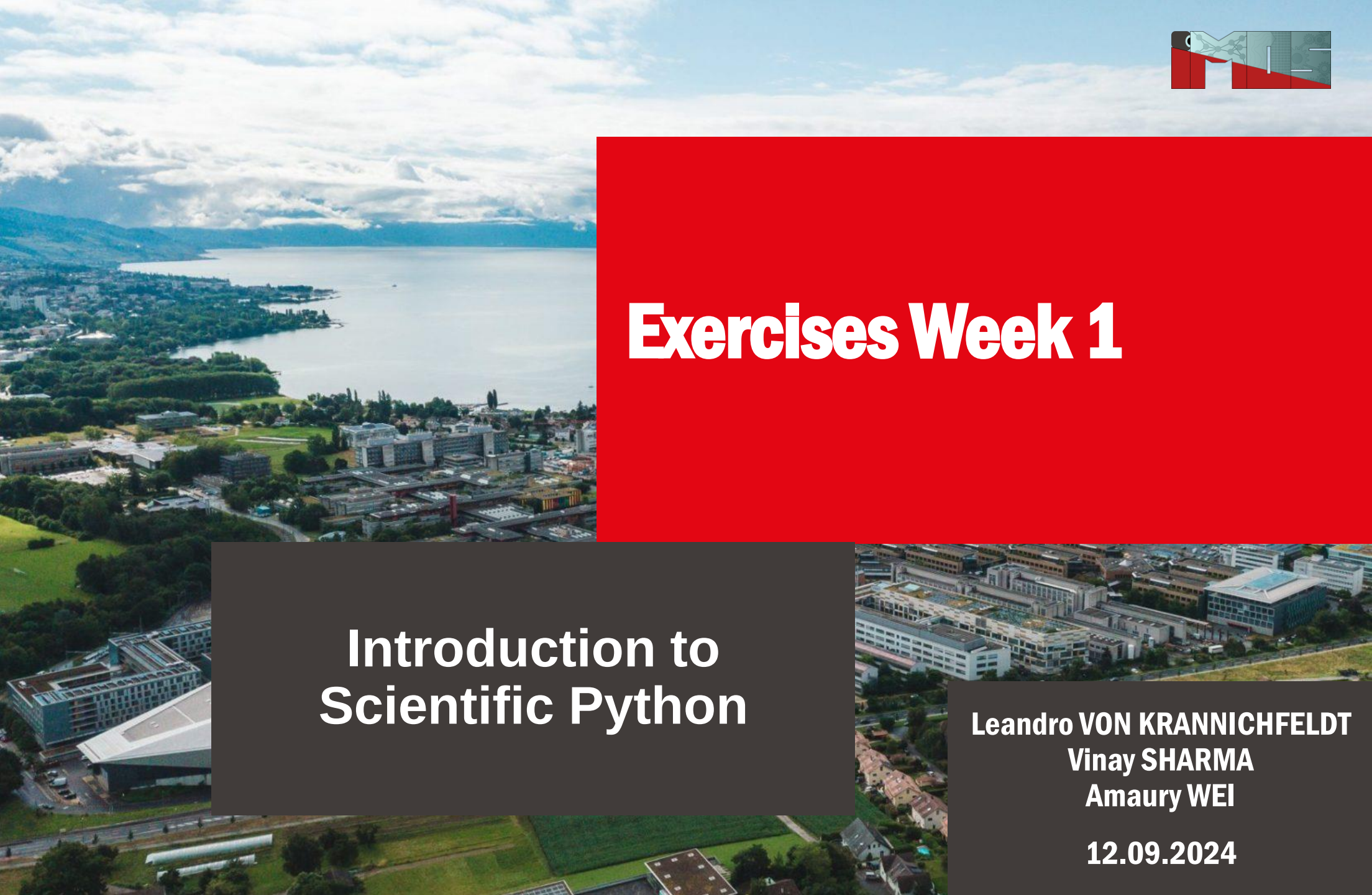


The background of the slide is an aerial photograph of Lake Geneva and the EPFL campus. The lake is visible in the upper half, with mountains in the distance. The campus buildings are in the lower half, surrounded by greenery.

Exercises Week 1

Introduction to Scientific Python

Leandro VON KRANNICHFELDT
Vinay SHARMA
Amaury WEI

12.09.2024

Go to

<https://menti.com>

Enter the code

7506 6620

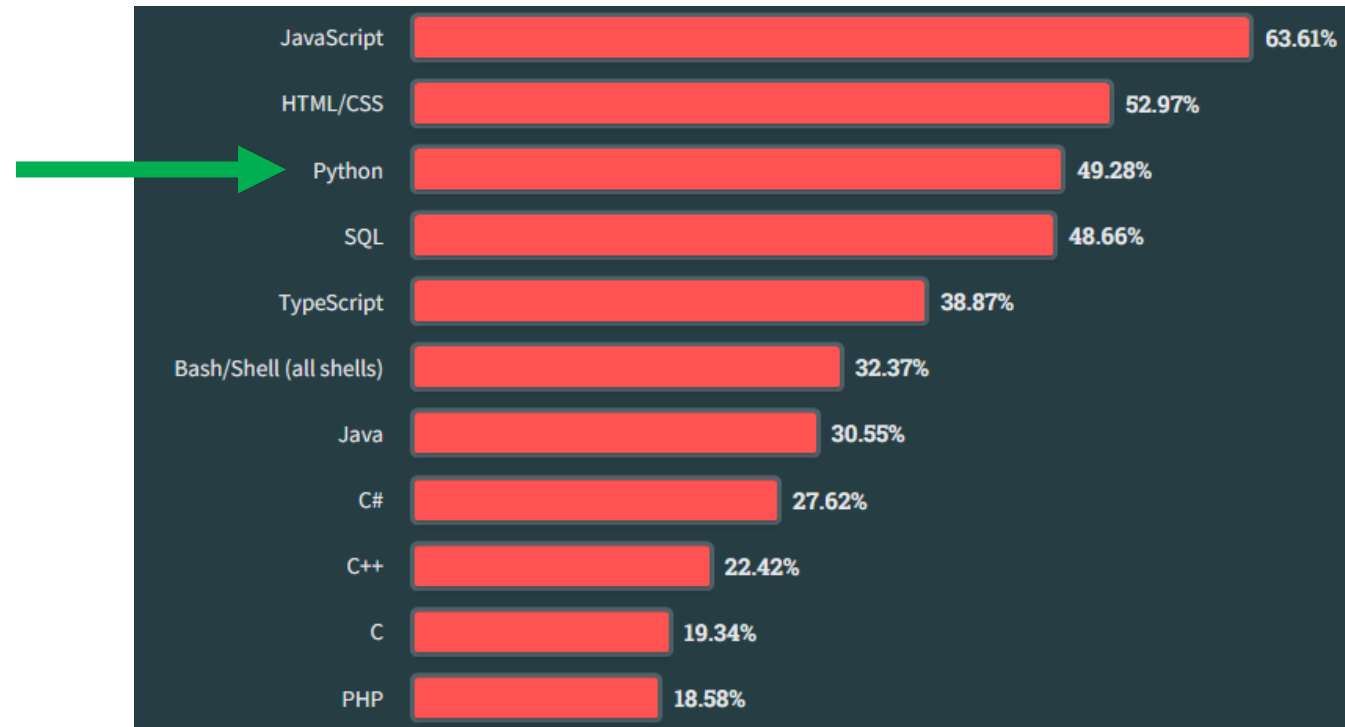


Python is great

- Very popular
- Versatile, flexible, easy to get started
- Widely used for data science
- Active community

But ...

- Performance can be limited
- Mistakes can arise quickly
- Complex projects can get messy



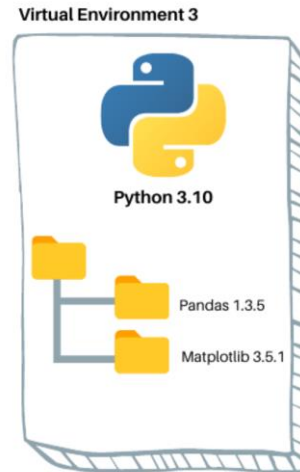
[Stack Overflow Developer Survey 2023](#)

Recommended IDE



Visual Studio Code

Virtual Environment

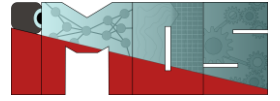


Automatic Formatting



Recommended VS Code extensions:

[Python](#) + [Jupyter](#) + [Black Formatter](#) + [autoDocstring](#)

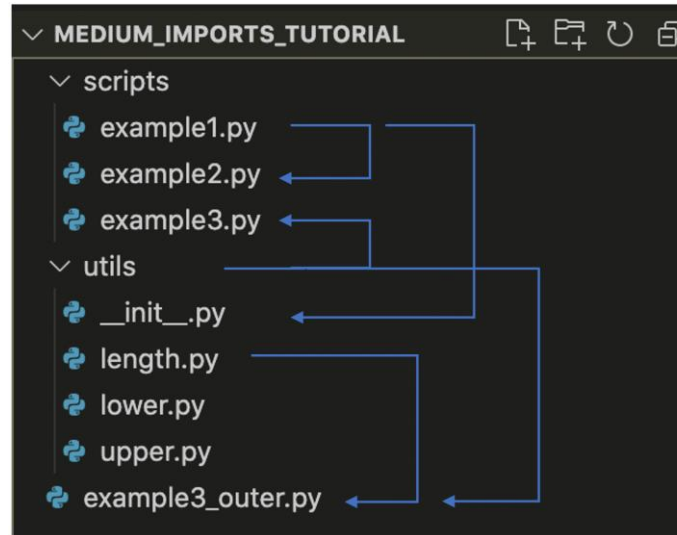


Consistent Coding Style

Function	function, my_function
Variable	x, var, my_variable
Class	Model, MyClass
Method	class_method, method
Constant	CONSTANT, MY_CONSTANT, MY_LONG_CONSTANT
Module	module.py, my_module.py
Package	package, mypackage

[PEP8 style guide](#)

Packages & Modules



[Modules in Python](#)

Documentation

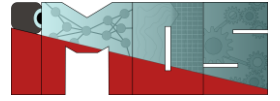
```
def connect_to_next_port(self, minimum: int) -> int:
    """Connects to the next available port.

    Args:
        minimum: A port value greater or equal to 1024.

    Returns:
        The new minimum port.

    Raises:
        ConnectionError: If no available port is found.
    """
```

[VS Code autoDocstring](#)

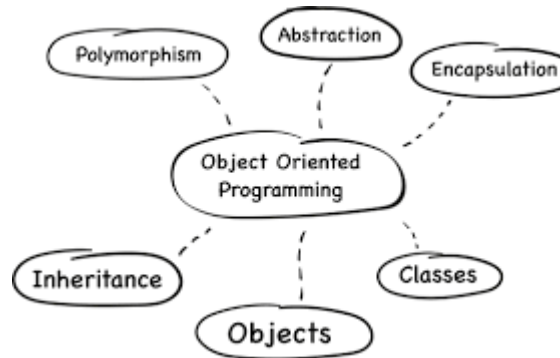


Version Control



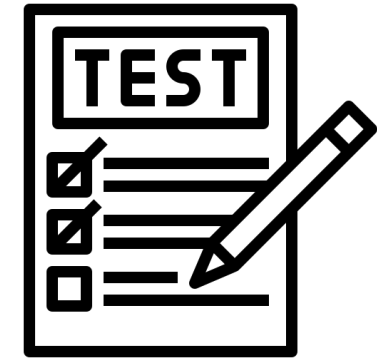
gitlab.epfl.ch

Object Oriented Programming



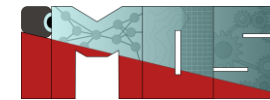
But **KISS**
(Keep It Simple
and Stupid)

Unit Testing



[PyTest](https://docs.pytest.org/en/latest/)

Setting-up the Development Environment



1. Download Python via an [Miniconda](#) (recommended)



- On Windows: keep the default installation options
- On macOS: run `~/miniconda3/bin/conda init zsh` after installation in a terminal
- On Linux: run `~/miniconda3/bin/conda init bash` after installation in a terminal



2. Create the conda [virtual environment](#)

1. Open a new terminal (**Anaconda Prompt** on Windows, default terminal on macOS / Linux)

2. `conda create --name civil-426 python=3.12`

Only needed once for the whole course

3. `conda activate civil-426`

Run this **everytime** you open a new terminal to work with this env.

4. `pip install numpy matplotlib scipy pandas jupyterlab --upgrade`

5. `pip install black librosa --upgrade`

`pip install` commands are only required once for the whole course

civil-426: Name of the virtual environment (you can customize it)

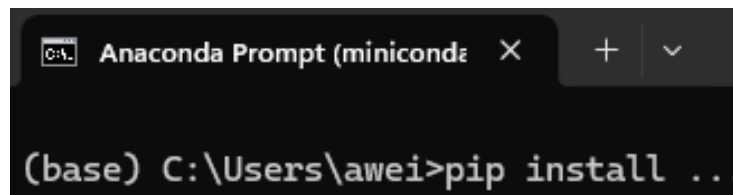
1. I installed the packages but Python says they are missing



```
PowerShell 7.4.5
PS C:\Users\awei> pip install ...
```

BAD ! You don't have conda active in the terminal.

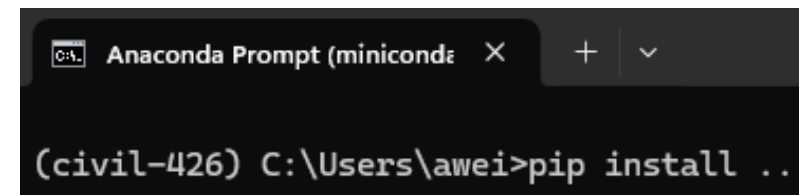
Windows: use Anaconda Prompt
macOS/Linux: run the `init` command (step 1 on prev. slide)



```
Anaconda Prompt (miniconda)
(base) C:\Users\awei> pip install ...
```

BAD ! Your virtual environment is not activated.

Run the following command:
`conda activate civil-426`



```
Anaconda Prompt (miniconda)
(civil-426) C:\Users\awei> pip install ...
```

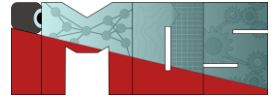
GOOD ! Your virtual environment is activated. You can now install the required packages.

2. VS Code does not find my virtual environment

If you can activate the virtual environment in an Anaconda Prompt, simply restart VS Code.

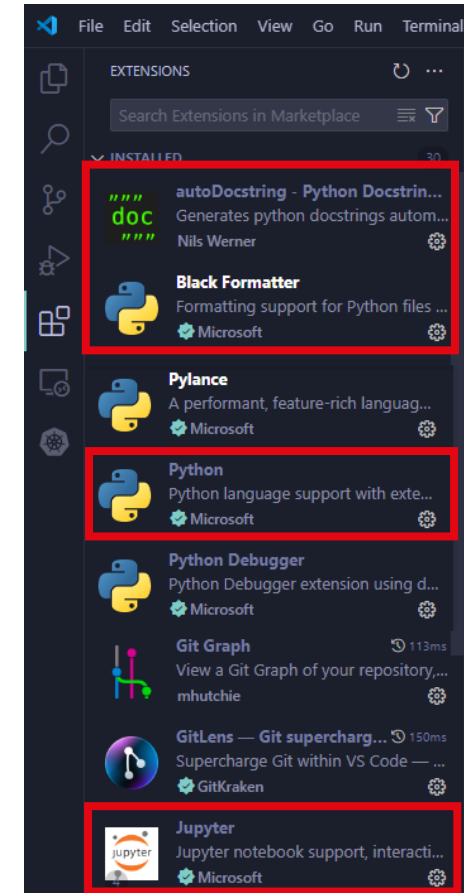
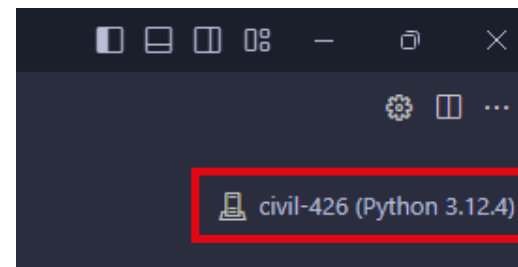
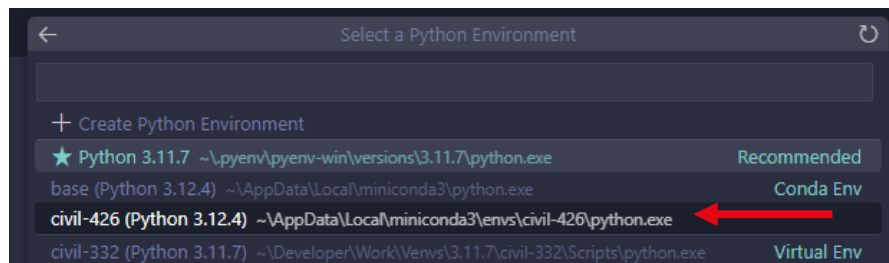
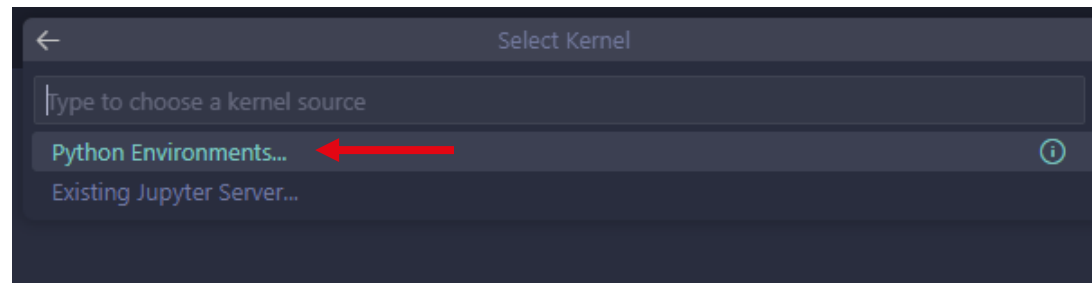
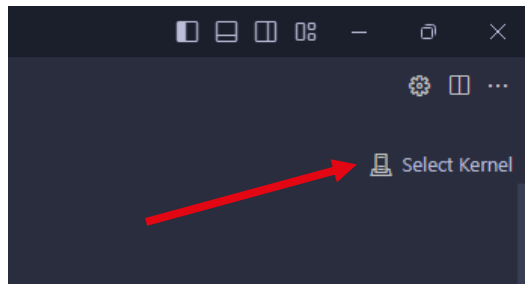
3. I cannot access my virtual env. in the terminal of VS Code

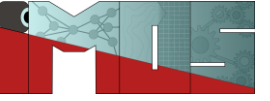
This should only happen on Windows. It's expected. Use Anaconda Prompt instead.



1. Download your preferred IDE ([VS Code](#), Pycharm, ...)
2. Install the recommended VS Code extensions
3. Open the `Exercise_0.ipynb`:

1. Select the right Python kernel





<https://noto.epfl.ch/hub/>

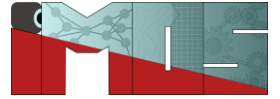
EPFL's online JupyterLab hub for notebooks, but ...

- No GPU resources
- Limited control over the environment
- Limited code editor

Recommendation:

Learn to setup and use your own environment





<https://moodle.epfl.ch/course/view.php?id=17052>

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Open course index

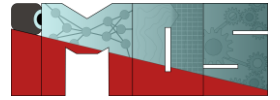
Civil Engineering (GC) / GC - Master

Machine learning for predictive maintenance applications

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Announcements



■ Basics

- [The Python Tutorial](#)
- [General Introduction to Programming](#)
- [General Introduction to Python](#)

■ Practical tutorials

- [Learn Pandas Tutorials](#)
- [Learn Data Visualization Tutorials](#)
- [Learn Data Cleaning Tutorials](#)
- [General Introduction to Machine Learning](#)



Questions