

# Python for MUDE in Vocareum

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November 21, 2022

## 1 Python for MUDE

Welcome to this online course to learn some basic Python skills, which you will need at the start of your masters in either Applied Earth Sciences, Environmental Engineering or Civil Engineering at the Delft University of Technology. All students are expected to have these basic skills - this course can help you if you're completely new to programming, but also if you learned programming in another language or you just like to do a refresher course.

The course comprises 6 Python Notebooks:

1. Introduction to Python, Variables, Operators, Functions
2. Modules, Conditions and If statements, Data structures, Loops
3. Advanced strings, Functions, Working with files, Debugging
4. Objects and references
5. Numpy, Matplotlib
6. Pandas

Depending on your prior programming skills, each notebook may take 2–5 hours on average. Don't worry if some concepts are not completely clear to you. The main goal is that you are familiar with all of this, but you can always go back once you need it for your real programming tasks.

Later this Summer, we will also post one or more notebooks to practice with (the exercises will be related to the above topics).

## 2 What is Vocareum

Vocareum is a cloud-based, third-party educational service used in this course to give you access to developed Python Notebooks. This service also includes the functionality to auto-grade your work. This document contains a brief introduction to the system to help you access and work in the Vocareum Environment. In case of any problems, you should contact the instructors of the course via [MUDE-CEG@tudelft.nl](mailto:MUDE-CEG@tudelft.nl) (or consult with the official [Vocareum support](#)).

## 3 Accessing Vocareum

In order to access Vocareum, you must be enrolled by one of the instructors. After enrollment, you will receive a confirmation e-mail with all the necessary credentials to access it. Figure 1 shows an example of a confirmation e-mail.

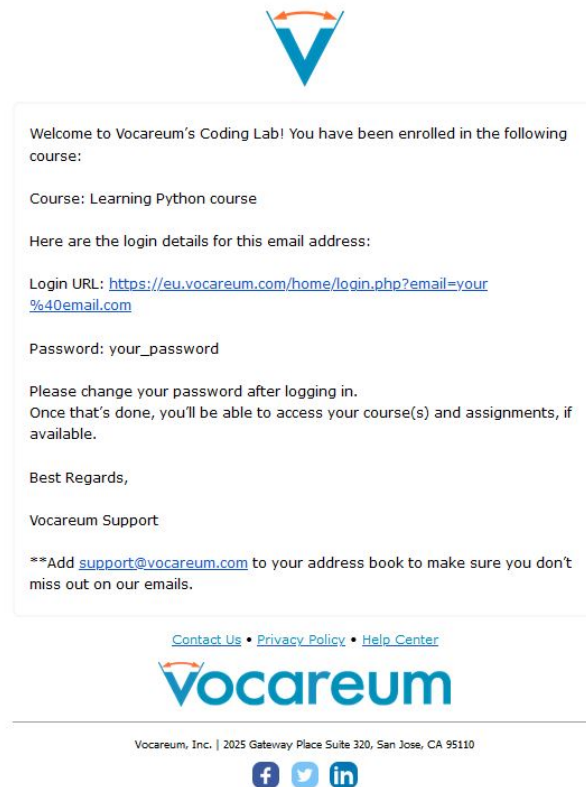


Figure 1: Example of a confirmation email.

Clicking on the **Login URL** will grant you access to Vocareum.

## 4 Working with Notebooks

### 4.1 Accessing assignments

After you have gained access to the environment, you can start working on the Python Notebooks. First, log into the system and click on *Python for MUDE*. Then, on the left side, you can see all assignments that are available to you. After clicking on one of them, an extended view of the assignment will be shown (example in Figure 2).

Figure 2: Example of an assignment view. On the left side, are all available assignments. In the middle, is a short details summary. Underneath it, is your score for each question of that assignment.

## 4.2 Jupyter Notebook

You can work on this assignment's Python Notebook by clicking on the My Work button. It will redirect you to your local Jupyter Notebook instance, started on the Vocareum server (example in Figure 3). There, you will find the Python Notebook and a resource folder. Any data file needed to perform any exercise will be located in the resource folder. In case you are not familiar with Python Notebooks, a small introduction is given in the first assignment. Clicking on the Notebook's name will open it in a new window.



Figure 3: Example of the homepage of Jupyter Notebook. It will contain the Python Notebook, and a resource folder with needed datasets.

Every Notebook consists of theory and examples, followed by exercises. In case a topic is unclear or you are curious to learn more, additional study materials are listed after each section. When working with your Notebook, you are allowed to add new cells to try out shown examples or to make notes. However, cells with theories and explanations are immutable (read-only cells), meaning that you cannot alter them. The only cells you are expected to change, are the exercise cells. To ensure the auto-grader works properly, we request you to **not change the name of the variables or the output of the exercise functions**. You can also use the reset button (on the top right), to get back to the original version of the Notebook. Keep in mind that resetting the Notebook, **will remove all changes**. If you have to reset it, but you would like to keep your notes and solutions, you can download the Notebook before doing so. To download, click on **File -> Download as -> Notebook (.ipynb)**. Then, you can run your downloaded version locally.

## 4.3 Saving progress and auto-grading

During your working session, do not forget to save your progress in **File -> Save and Checkpoint**, or by hitting **Ctrl+S**. Vocareum automatically saves your progress as well, but not that frequently. After you have saved your work, you can exit the environment by just closing the browsers tab. Logging into Vocareum again will continue your progress from the last saved instance.

If you want to check some of your solutions, you can submit your Notebook by clicking the **Submit** button, on the top right. It usually takes less than a minute to auto-grade your exercises; by the end of the grading, a summary of your scores will be shown (example in Figure 4). The **Grading Report** button shows you the output of the auto-grader, for each exercise.

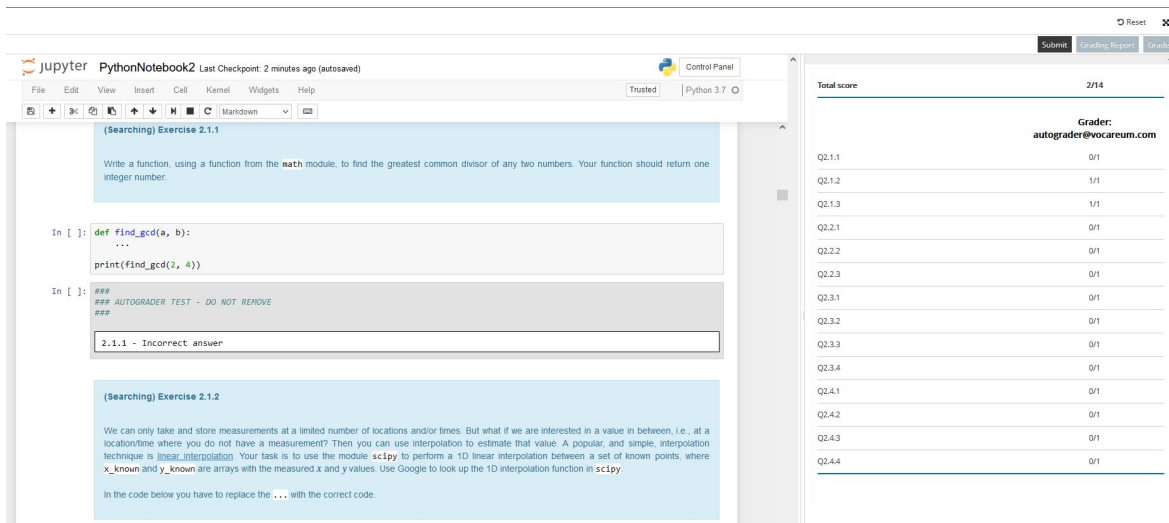


Figure 4: Example of a graded Jupyter Notebook, in Vocareum. On the right side, the summary of received scores: 0 for wrong solutions and 1 for correct ones).

In case you did not manage to solve some exercises, you can check the solutions in the PDF file that will be made available in the folder `./resource/lib/publicdata` (see Figure 3, where you can see the resource folder).