

This is a recipe on how to get access to the course material for the introductory lectures to PorePy, including installing a Docker container with all dependencies. Please complete the below instructions below before arriving at the winter school, or at the very latest before the PorePy lecture. As previously noted, we will not have the capacity to provide guidance in installation during the lectures.

To those who already have working installations of PorePy and jupyter and do not want to use the Docker container, the lecture notes are available at https://github.com/keileg/csd_winterschool_2023/tree/main. Please clone this repository and verify that you can run the notebooks by following steps 5.-8. in the below instruction (likely with a different command in 5., depending on your jupyter installation).

Installation instructions:

1. Install Docker desktop: Go to <https://docs.docker.com/desktop/>, select the download relevant to your operating system and follow the instructions. Note that the install may require admin/sudo access, and it may take a while to do the install.
2. Open a terminal window (on Linux/Mac) or Powershell (on Windows) and type

```
docker pull porepy/csd_winterschool:latest
```

This will download the Docker image which contains the full course setup. The command may download several GB of data, so make sure you are on a fast connection.

3. **The first time you start the container:** In the terminal/Powershell window, type

```
docker run --name winterschool_container -it -p 8888:8888 porepy/csd_winterschool:latest
```

This will create a container from the image, log into the container, and make a connection between the container and the host (your standard operating system). NOTE: Some MACs may produce a warning for this command, but it should still work.

4. The container is essentially an Ubuntu system with pre-installed PorePy as well as the lecture material for the winter school. First, to make sure you have the latest version of the lecture material, type

```
cd csd_winterschool_2023; git pull; cd ..
```
5. The lecture notes are a set of Jupyter notebooks (if you have not used Jupyter before, google it, or try [this link](#)). To start the notebook, run this command:

```
./local/bin/jupyter notebook --ip 0.0.0.0 --no-browser --allow-root
```

This will print out some information; towards the bottom, you should see a line which reads

‘Or copy and paste one of these URLs: <http://127.0.0.1:8888/?token=...>’ where the dots represent a long string of letters and numbers. Copy that line, open a browser, paste the line and push enter. This will open a page which shows the jupyter notebook that runs in the Docker container.

6. Click on the file called 'mixed_dimensional_flow.ipynb' (you should either see it directly, or you will first need to enter the folder called 'csd_winterschool_2023'. This will open a file which contains a mixture of text and code.
7. Click on the 'Run' button several times, without modifying the file otherwise. This will bring you further down the page, and, for the parts of the file which contain code, this code will be executed in the Docker container. Verify that the entire file can be run with no error messages.
8. To exit the notebook, click logout.
9. Before exiting the container, interrupt the jupyter server by typing CTRL-C + Yes.
10. To exit the container, type CTRL-D in the terminal.
11. To re-enter the container type

```
docker start -i winterschool_container
```

Note that if you instead type `docker run ..` (as in step 3), a new container will be created, and you will not get access to any changes you previously made to the container.