

Machine Learning Programming

Introduction



Course Content:

- Pure Programming Course
- Content follows Applied Machine Learning course (Thursday 10am-1pm)

Prerequisites:

- Programming in MATLAB, at least version **R2022b (already installed on the computers)**
- Basics in Machine Learning:
 - Principal Component Analysis (PCA)
 - K-nearest Neighbor (KNN)
 - K-means
 - Gaussian Mixture Model (GMM)
 - Applications of GMM
 - Neural networks

Material for the class

 <https://moodle.epfl.ch/course/view.php?id=15218>

EPFL MOODLE

Machine learning programming

Dashboard > My courses > MICRO-401

- Matlab Code Assignment
- Submission Site

 <https://moodle.epfl.ch/course/view.php?id=14821>

EPFL MOODLE

Applied machine learning

Dashboard > My courses > MICRO-455

- Theoretical Material
- Videos, slides, exercises



 <https://tube.switch.ch/channels/7e86d16d>

EPFL <https://tube.switch.ch/channels/7e86d16d>

LASA - Machine Learning Courses

Aude Billard, École polytechnique fédérale de Lausanne (EPFL)

Repository of all videos

☐ **6** Graded Assignments (check moodle for deadline)

➤ Check submission dates on Moodle!

➤ 1pt will be removed for each day late. A day late starts one hour after the deadline.

☐ **Final grade is:**

75% on average grade of the 5 best out of the 6 graded assignments

**25% on a multiple-choice exam held on side from 8h15 - 9AM
on December 4, 2024**

Honesty Pledge

Individual work not a team's submission – plagiarism!

Not allowed to use coding help software

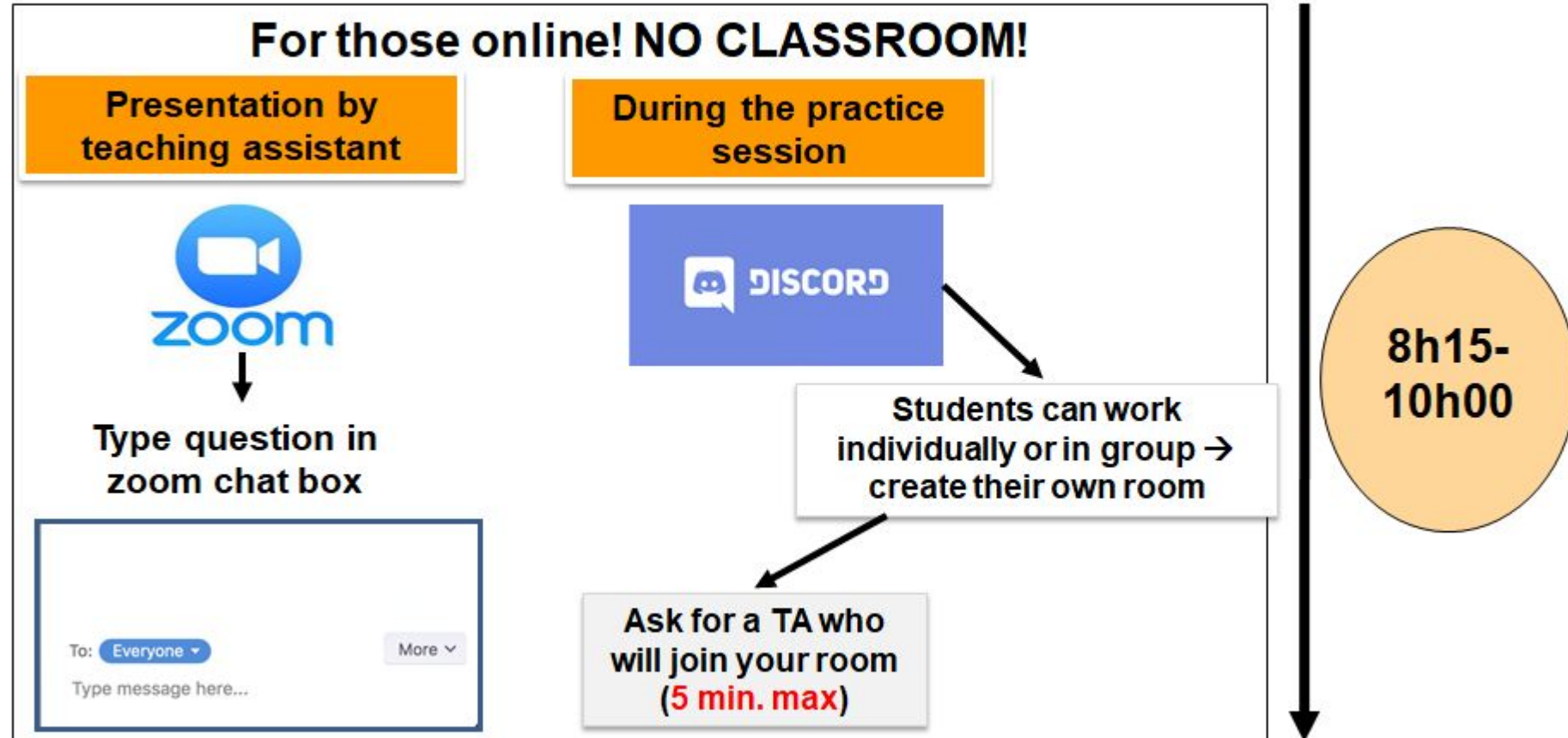
You can use Virtual Machines (VM) to have a working environment.

To connect from your computer:

- Go to <https://vdi.epfl.ch/>
- Click on install VMware Horizon client and download the client for your distribution
- Start the client and click on New Server
- Enter <https://vdi.epfl.ch> as Connection Server and click on Connect
- Use your Gaspar credentials and log in to STI-WINDOWS 10

 **Do not save anything outside of the Documents folders! It will be destroyed after you close the VM!**

Computer sessions on Matlab



Discord server is used to ask questions (for students on-line primarily!). Access the server from the following link:

<https://discord.gg/zN5RFxQ6yh>



We recommend that you install the Discord desktop application from <https://discord.com/> as you can't share your screen from the web interface.

- You can use it to work in group, but remember to submit your own work (cf. plagiarism)
- Teaching assistants have vocal rooms in which you can share your screen and ask for help.
- See the pinned messages in the different channels to use the discord correctly.



buschbapti Today at 9:38 AM

Dear students, welcome to the discord server for the Machine Learning Programming course. Here is some instructions on how to use this server in a good fashion.

There are some channels on the left panel that you can access by clicking on it. You can ask questions on the [#questions](#) channel. We will reply to them during the hours of the lectures, i.e. from 8.15 to 10am on Wednesday morning. Questions asked outside of this time period will be answered only on the next period.

In the [#ask_for_assistance](#) channel, you can tell a teaching assistant (TA) that you would like some help by calling all the TA with [@teaching_assistant](#) macro. A free TA will then move you to one of the audio TA rooms. Please do not enter one of those rooms by yourself.

In the private channels category there are a few private rooms. You can use them to work in groups. If more rooms need to be created simply ask and we will add some.

Please remember that this is a server for lectures only. Any posts non related to the lecture are strictly forbidden.

Assignment are uploaded on Moodle (<https://moodle.epfl.ch/course/view.php?id=15218>) as HTML file.



Each assignment is made available only the day of the lecture.

Machine learning programming

Dashboard › My courses › MICRO-401 › General › Useful functions for Machine Learning Programming in Matlab

Useful functions for Machine Learning Programming in Matlab

Useful functions for Machine Learning Programming

Throughout this course you will be asked to program Machine Learning algorithms seen in the Applied Machine Learning course. In this article we will cover some useful functions that will ease your programming.

Random Number Generator

Random number are not random in Computer Science. The generation of random numbers is performed by algorithms often referred as pseudo-random number generator. In Matlab, a random number is drawn using the `rand` function.

```
In [11]: disp(rand())  
0.8147
```

Start Matlab and call this function. If you had Matlab already started just close it and restart it before. Did you actually end up with the same exact number as above? Okay maybe it was a coincidence let's try something else.

```
In [21]: disp(rand(3))  
0.9058    0.6324    0.5469  
0.1270    0.0975    0.9575  
0.9134    0.2785    0.9649
```

This is simply the effect of the **seed** in random number generation. Matlab actually set the same seed at startup. Not so random after all.

But for some applications it can be very useful to be able to replicate the series of numbers drafted by the generator. Take the case of comparing two ML models as an example. For your comparison to be totally fair you want to ensure that your data are shuffled randomly but in the exact same way with both models. Your best option would be the use of random seed. In Matlab, seed are defined as follow.

```
In [31]: n = 42; % I can take any integer here so let's take the most random one...
```