# Syllabus

## Course Title

Robust and Reproducible Experimental Deep Learning Setting

## Lecturer Info


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## Abstract


With the advent of deep learning techniques and hardware breakthroughs, a lot of scientific papers focus on contributing novel methods, strategies, tasks, and approaches in a wide variety of domains.

One major bottleneck when developing novel research ideas is to define adequate experiments. Researchers aim to define experiments that corroborate their initial hypotheses. Nonetheless, depending on the setup, defining such experiments may be non-trivial or, more in general, prone to common errors.

In this course, we'll introduce different evaluation procedures for assessing a model's performance (evaluation routines, controlled multi-seeding, evaluation criteria) and overview different experimental research scenarios. Additionally, we'll also provide advanced coding recommendations for defining a correct experimental setup. We'll use popular deep-learning libraries like Tensorflow and Pytorch.

This course is recommended for researchers who are experienced with Python programming and any deep learning framework (Keras, Tensorflow, Torch). See Section Prerequisites for more details.


## Program

Down below, you can find the program of the course. Please, be aware that the provided schedule may be subject to modifications (you'll be updated via email accordingly).

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| Lecture 1: | Defining an experimental scenario: concepts |
| Lecture 2: | Defining an experimental scenario: implementation |
| Lecture 3: | Advanced Tensorflow/Pytorch |
| Lecture 4: | Common Mistakes and Best Practices |
| Lecture 5: | Deasy-Learning: a simple deep learning framework for research |

## Course Info

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| Duration: | 10 Hours |
| Lecture Format: | 2 hour-long hybrid lectures. |
| Exam: | See Section Exam |
| Period: | Spring 2023 |
| How to Participate: | Please fill this Google Form to participate. |

## Prerequisites

Lectures are meant to be interactive. A GitHub repository will be made available for participants. Lectures will be carried out via Jupyter notebook.

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| Python: | Intermediate |
| Keras/Tensorflow/Torch/Other: | Intermediate |
| Deep Learning Theory: | Intermediate |
| Research Experience: | Beginner |
| Jupyter Notebook: | Beginner |

## Exam

If you need to certify your participation in the course via an exam, you can choose one option from the ones reported below. **All submissions are made by contacting me via email**.

**Review** You can report a review you have made concerning the experimental setup of a paper of your choice. Please submit your review in .pdf format (1-2 pages at most). I kindly ask you to analyze the pros and cons of the considered experimental setup.

**Code** You can submit a code snippet (either a GitHub repo or a notebook) describing how you used certain advanced deep learning APIs/functionalities (e.g., efficient data loading, parallel training, custom architectures, etc..). I kindly ask you to report a .pdf report (1-2 pages at most) that summarizes and motivates your implementation. You can submit code snippets used in your research activity.

**deasy-learning** As a variant of the Code option, you can submit a code snippet written using my deep-learning library. As in Code, I kindly ask you to report a .pdf report. Feedbacks are welcome!