# Course Introduction

Deep Learning
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# Course Introduction

## Position in the Curriculum

- This course is part of the "Capture, Model & Predict" learning path.
- It is the natural successor of the "Machine Learning" course you took in the second year.

# Course Objectives

The course's learning objectives (in Dutch) are the following:
De student
- Kan de hoofdlijnen van de werking van verschillende types neurale netwerken (zoals MLPs, convolutionele, recurrente, transformers) beschrijven.
- Kan het gepaste type neurale netwerk kiezen voor een bepaald probleem.

## Course Objectives (Continued)

- Kan verschillende types neurale netwerken implementeren a.d.h.v. een bibliotheek voor Deep Learning (bv. Tensorflow/Keras)
- Kan de performantie van een deep learning model op een methodologisch correcte manier evalueren.
- Kan de belangrijkste hyperparameters van een deep learning model op een methodologisch correcte wijze afstellen.
- Kan data inladen en bewerken m.b.v. een bibliotheek voor Deep Learning (bv. Tensorflow/Keras)

## Course Contents

- What is a neural network?
- Convolutional neural networks (for image processing)
- Efficient data pipelines using `tf.data`
- Recurrent neural networks (for sequence processing)
- Transformers and attention.

## Learning Materials

- We follow the second part of the book "Hands-on Machine Learning with Scikit-Learn, Keras & Tensorflow" by Aurélien Géron.
  - The link to the Github repository of the book is **here**.
  - The book is available in electronic form in the HOGENT library.
  - The book is **highly recommended** for this course.
- Slides are available on Chamilo.
- (Practical) exercises are available on Chamilo.

# Programming Environment

For the Python programming exercises you can use

- **Google Colab**
- **Kaggle**
- Your own computer

# Lectures

- 3 (consecutive) hours of lectures per week.
- We will try to maximize the time spent (programming) on exercises.
    - You will have to **prepare for the lectures** by reading the book and slides or watching the videos **beforehand**!

# Warning!

*This course has some **very challenging** topics. You will need to **work hard** to pass this course.*

# Communication with Lecturers

- The primary means of communication with the lecturers is via the **Chamilo forum**.
- Only **personal** questions should be sent via email.
- Do **NOT** chat or call us through Teams.
  - Status "available" means that we are available for colleagues, not students.

# Exam

# Evaluation

- 35% theoretical closed book exam.
    - We will provide example questions that you can use to prepare for the exam.
    - These questions will **not** be exhaustive.
- 65% practical open book exam using Python:
    - You can use the slides, book and example code.

# Questions?