



# Introduction to AI, machine learning and neural networks

July 14-18-2025

<https://utrechtsummerschool.nl/courses/engineering-technology/introduction-to-artificial-intelligence-machine-learning-and-neural>

# The team

## Course directors:

- Dr. Sieuwert van Otterloo
- Dr. Sietske Tacoma
- Dr. Stefan Leijnen

## Teaching assistants:

- Experienced CS and AI student from Utrecht University of Applied Sciences

## Guest lecturers:

- Researchers in responsible AI and AI applications (e.g. finance)

# Agenda

Monday : Data science	Tue: machine learning	Wed: neural networks on datasets	Thu: neural networks on images	Fri: Evolutionary algorithms
Data exploration and visualization – Sieuwert	Decision trees and regression - Sieuwert	Prediction with neural networks, Sieuwert	Image recognition – Sieuwert	Evolutionary algorithms ; recent research; challenges
Future of AI	Word Embeddings – generative AI	Explainable AI	AI ethics and values	AI and ethics – self-evaluation test (optional)

16:00: Drinks with AI research group

# Structure of each day

Time	Content	Remarks
9.00 – 9.15	Walk-in and coffee	Monday: be in hall at 9.00, lecture starts at 9.30
9.15 – 9.30	Recap and questions	Discuss previous day. On day 1: check if people have practical questions
9.30 – 10.30	Theory	Presentation by lecturer of key concepts
10.30 - 10.45	Coffee break	
10.30 – 11.45	Practical session	Working on assignments, individual or in groups
11.45 – 12.15	Discuss practice results, conclusion	
12.15 – 13.15	Lunch	
13.15 – 14.30	Theory	Presentation by (guest) lecturer of key concepts
14.30 – 14.45	Coffee break	
14.45 – 15.45	Practical session	Working on assignments, individual or in groups
15.45 – 16.15	Discuss practice results, conclusion	
16.15 – 16.30	Time for individual questions	Lecturer is available for individual questions

\* Day one will start later at 9.30

# Practical aspects

- You will need a laptop and perhaps paper+pen for taking notes. Otherwise, all material will be provided.
- We will be using google collab for running python code. Make sure you have a google account to use this service. If you have python experience, you can also use your own computer but that is more effort
- The course is designed to be understandable with and without computer experience. If you want to prepare, read the first two chapters from <https://jakevdp.github.io/PythonDataScienceHandbook/>