UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Deep Learning for Physicists

2425-1-113R-03

Title

Introduction to Deep Learning for Physicists

Teacher(s)

Stefano Giagu

Language

English

Short description

Monday June 16

- Lecture 1: Artificial Neural Networks 101
- Exercise session 1: introduction to the pytorch framework and implementation of a simple ANN

Tuesday June 17

- Lecture 2: Regularization and Training of an ANNs

- Exercise session 2: end-to-end design and training of an MLP to learn the dynamic of a mechanical system, Hamiltonian NNs

Wednesday June 18

- Lecture 3: Neural Network Models for Sparse Interactions: CNNs and Graph Neural Networks
- Exercise session 3: training a CNN to identify phase transitions on a 2D Ising Model

Thursday June 19

- Lecture 4: Unsupervised learning and Anomaly Detection with Auto Encoders
- Exercise session 4: representation of the latent space learnt by an AE, anomaly detection in high-energy physics

Friday June 20

- Lecture+exercise 5: Uncertainty quantification in ANNs, Bayesian NNs or recent trends in deep dearning
- Hackathon/final exam

CFU / Hours

Teaching period

Sustainable Development Goals

QUALITY EDUCATION | INDUSTRY, INNOVATION AND INFRASTRUCTURE