



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## SYLLABUS DEL CORSO

### Deep Learning for Physicists

2425-1-113R-03

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#### Titolo

Introduction to Deep Learning for Physicists

#### Docente(i)

Stefano Giagu

#### Lingua

English

#### Breve descrizione

##### 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 learning
- Hackathon/final exam

## **CFU / Ore**

## **Periodo di erogazione**

## **Sustainable Development Goals**

ISTRUZIONE DI QUALITÀ | IMPRESE, INNOVAZIONE E INFRASTRUTTURE

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