

PhD course in Physics, Astrophysics, and Applied Physics - Università degli Studi di Milano
PhD cycle 40 (2024-2025)

All lectures will be given in English.

Course title	Computational, simulation and machine learning methods in High Energy Physics and Beyond: Machine Learning
Teacher in charge of the course	Stefano Carrazza
List of the teachers of the course <i>[surname/name; affiliation; e-mail]</i>	Stefano Carrazza, University of Milan, stefano.carrazza@unimi.it
Training objectives	An introduction to machine learning techniques including model representation, parameter learning, non-linear models, hyperparameter tune, and an overview of modern deep learning strategies. The seminars will cover the theoretical and mathematical aspects of machine learning followed by practical examples of code implementation using public frameworks.
Prerequisites <i>[please insert details and also state whether the course has advanced contents suitable for students with prior knowledge of the topics or is also suitable for students without prior knowledge]</i>	Statistics, basics of programming languages.
Detailed course program	<ul style="list-style-type: none">- Definition of Deep Learning, the current importance, challenges and limitations.- Non-linear models, performance metrics and training techniques.- Hyper-optimization techniques.- Regression and classification models with deep learning.
Examination modalities	Oral examination.
Preliminary schedule <i>[please indicate the weeks when the lectures will be given]</i>	1-5th of February.