

**Course: Introduction to Machine Learning and its Applications**

Lecturer: Graziano Ucci

Date: 8,9 May 2018

Classroom: Sala del Camino

**Course schedule**

Week	Date	Lecture hours	Tutorial hours	Subject	Tot h
		From 8 may To 9 may	From ____ To ____		
1	8 may	12:00 – 13:00		Astrophysical application of Machine Learning	1
	9 may	14:00 – 17:00		Introduction to Machine Learning and technical aspects	3

**Brief Contents Description and Course Syllabus:**

This course is a brief introduction to Machine Learning and its applications. Emphases are on the understanding of the general concepts and on the introduction of the most used algorithms. It is an exploratory, first course designed primarily for students planning to attend more advanced courses in statistics/computer science involving Machine Learning techniques. However, it also meets the needs of many students with other interests, whose plan is to use Machine Learning libraries and who want a general "feel" for the general concept inside these libraries. The course will cover the following topics: (1) Inferring physical properties of galaxies with a Machine Learning Approach; (2) Definition of Machine Learning; (3) Utility of Machine Learning; (4) Case studies; (5) Most common libraries, programming languages; (6) Training/Validation/Testing datasets; (7) Overfitting; k-fold Cross-validation; (8) Machine Learning algorithms (Linear Regression, Support Vector Machines, Decision Trees, Neural Networks, Random Forest); (9) Introduction to Deep Learning; (10) Image recognition with Convolutional Neural Networks