Syllabus

Descrizione corso

Titolo insegnamento	Machine Learning
Codice insegnamento	27503
Titolo aggiuntivo	
Settore Scientifico-Disciplinare	INF/01
Lingua	Inglese
Corso di Studio	Corso di laurea magistrale in Data Analytics for Economics and Management
Altri Corsi di Studio (mutuati)	Loaned from course 73078 - Master in Computing for Data Science (LM-18)
Docenti	dr. Andrea Rosani, Andrea.Rosani@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/43727 prof. Giuseppe Di Fatta, Giuseppe.DiFatta@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/46582
Assistente	
Semestre	Secondo semestre
Anno/i di corso	1
CFU	6
Ore didattica frontale	40
Ore di laboratorio	20
Ore di studio individuale	-
Ore di ricevimento previste	18
Sintesi contenuti	This course offers a comprehensive introduction to the core concepts, techniques, and algorithms of machine learning, as well as some platforms commonly used in practice. Students will explore essential topics such as data preprocessing—including data manipulation, transformation, feature selection, and dimensionality

	reduction— followed by key methods in supervised learning like regression and classification. The course covers unsupervised learning approaches such as clustering and association rule mining. Moreover, Artificial Neural Networks are covered through the study of the perceptron, the multi-layer perceptron. An overview of deep networks and multi-task deep learning is provided. Foundational ideas, principles and applications of Reinforcement Learning are also covered. Throughout the course, students will not only develop a solid understanding of the theoretical underpinnings of these algorithms but also acquire practical skills in implementing data workflows, applying machine learning methods to real-world data, and evaluating model performance. Applications across diverse domains are discussed to illustrate the impact and versatility of machine learning.
Argomenti dell'insegnamento	The main topics include: • Data Analysis • Model selection • Unsupervised learning • Supervised learning • Deep learning • Reinforcement learning
Parole chiave	Machine Learning, Data Analysis, Data Mining, Data Science
Prerequisiti	Basics of Linear Algebra, Calculus and Statistics
Insegnamenti propedeutici	
Modalità di insegnamento	Frontal lectures, lab assignments, project work.
Obbligo di frequenza	The attendance is not compulsory, but students are highly encouraged to attend both lectures and labs.
Obiettivi formativi specifici e risultati di apprendimento attesi	
Obiettivi formativi specifici e risultati di apprendimento attesi (ulteriori info.)	
Modalità di esame	• A project, which consists in applying/implementing machine learning algorithms to real-world data, describing the approach and the adopted solution, and presenting the results of an experimental analysis. • A final oral exam with questions on the content of the course.

Criteri di valutazione	• Project: 50% of the final mark • Oral exam: 50% of the final mark Note: both project and exam are required to be passed. Criteria for awarding marks Oral exam: ability to present and explain machine learning concepts, methods and algorithms. Ability to select appropriate solutions for machine learning problems. Project: ability to implement data workflow to apply machine learning algorithms to real-world problems, correctness and clarity of the solution, experimental results, ability to solve machine learning problems with the appropriate technique.
Bibliografia obbligatoria	· Introduction to Data Mining, by Pan-Ning Tang, M. Steinbach, A. Karpatne, V. Kumar. Pearson Education Ltd (2nd Edition, 2020).
Bibliografia facoltativa	
Altre informazioni	
Obiettivi di Sviluppo Sostenibile (SDGs)	Istruzione di qualità