UNIVERSITÀ DEGLI STUDI DI BARI ALDO MORO

DIPARTIMENTO INTERUNIVERSITARIO DI FISICA

General information	
Academic subject	AI Programming in Physics
Degree course	Physics
Academic Year	1
European Credit Transfer and Accumulation System (ECTS)	3
Language	English
Academic calendar (starting and ending date)	II semester
Attendance	No

Professor/ Lecturer	
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Department and address	Physics Department, via Amendola 173, room R51
Virtual headquarters (Microsoft Teams code)	
Tutoring (time and day)	on request, via email

Syllabus	
Learning Objectives	Fundamentals of Python and Artificial Intelligence algorithms
Course prerequisites	Fundamentals of informatics and C++
Contents	Variable and data structure concepts. Modules and namespaces. Code writing, access to file and exception management. Fundamentals of numpy, matplotlib, pandas, seaborn. Fundamentals of Machine Learning, Deep Learning and CNN algorithms. Concepts of TensorFlow and Keras. Introduction to methodologies to solve Machine Learning problems. Parallel computing Architectures.
Books and bibliography	Learning Python, Mark Lutz, O-Reilly. Online documentation
Additional materials	

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
75	16	15	44
ECTS			
3	2	1	

Teaching strategy	Lectures and working group exercises

Expected learning outcomes	
Knowledge and understanding on:	○ Acquiring basic skills on Python programming language, dataset processing and visualisation and most important Artificial Intelligence algorithms ○ Ability to understand the problem under study
Applying knowledge and understanding on:	○ Ability to write a robust Python code ○ Ability to identify and propose a solution of under study problem
Soft skills	● **Making informed judgments and choices** ○ Identification of main components of under study problems, evaluation of advantages and limits of every solution and design and implementation of the selected solution ● **Communicating knowledge and understanding**

	○ Ability to model the under study problems and support the design with logic arguments ● **Capacities to continue learning** ○ Ability to identify and consult online documentation.

Assessment and feedback	
Methods of assessment	Oral presentation of the project
Evaluation criteria	● **Knowledge and understanding** ○ Evaluation of the most important points of interest of the project and selection of usable solutions ● **Applying knowledge and understanding** ○ Identification of advantages and limits of selected solutions and design and implementation of it ● **Autonomy of judgement** ○ Acquire knowledge and experience regarding the described algorithms in order to identify their strong points ● **Communicating knowledge and understanding** ○ Clarity and precision of oral presentation ● **Communication skills** ○ Acquire an appropriate rigorous language ● **Capacities to continue learning** ○ Ability to connections between the subjects of study
Criteria for assessment and attribution of the final mark	Clarity in oral exposition of the implemented project
Additional information	