UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze Umanistiche		
ACADEMIC YEAR	2023/2024		
MASTER'S DEGREE (MSC)	DIGITAL HUMANITIES FOR CULTURAL INDUSTRY		
INTEGRATED COURSE	INTELLIGENT DATA ANALYSIS		
CODE	20252		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	ING-INF/05		
HEAD PROFESSOR(S)	MAZZOLA GIUSEPPE	Ricercatore a tempo determinato	Univ. di PALERMO
OTHER PROFESSOR(S)	PIPITONE ARIANNA	Ricercatore a tempo determinato	Univ. di PALERMO
	MAZZOLA GIUSEPPE	Ricercatore a tempo determinato	Univ. di PALERMO
CREDITS	12		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	2		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	**MAZZOLA GIUSEPPE**		
	Wednesday 10:00 13:00	Ex Dipartimento di Ingegneria Informatica, edificio 6, terzo piano	
	PIPITONE ARIANNA		
	Wednesday 10:00 12:00	Studio della docente, Ed. 12, piano 5	

PREREQUISITES	Basic computer and programming skills
LEARNING OUTCOMES	The primary goal of the course is to provide the knowledge necessary for the design, management, analysis and processing of data, through Machine Learning and Data Analytics techniques KNOWLEDGE AND UNDERSTANDING: At the end of the course the student will be able to understand and deepen the problems related to the analysis, the management and the processing of data, using the tools and algorithms studied in class. From the study of architectures for the representation of databases, to the use of neural networks for classification, clustering and feature extraction. KNOWLEDGE AND UNDERSTANDING APPLIED: The student will be guided to implement the algorithms studied for applications on real datasets. It will also be stimulated to extrapolate the algorithms illustrated in the course from the specific context and to apply these algorithms (and related considerations) to other application scenarios. AUTONOMY OF JUDGMENT The student will be able to conduct different types of exploratory data analysis according to the problem to be addressed. You will be able to generalize the techniques and concepts acquired and establish relationships with those introduced in related disciplines. COMMUNICATION SKILLS The student will acquire the ability to rationally communicate his knowledge on the topics covered by the course, with mastery of the specialized vocabulary of the sector. In particular, you will have to be able to justify the choices in solving analysis and/or synthesis problems and to hold conversations on topics related to the topics of the course. CAPACITY TO LEARN The student will be able to independently explore the techniques not studied in the course and the scientific literature of the sector, to apply more complex methodologies.
ASSESSMENT METHODS	The exam will include two separate tests for each of the two modules (Artificial Intelligence and Machine Learning, Data analytics and storage), each with the methods established by the teachers. The overall mark will be agreed by the teachers of the two modules. The assessment of learning will be focused on the expected outcomes in accordance with the Dublin descriptors defined above. The final mark will be out of thirty (possible honors) Specifically, the marks will be assigned according to the following criteria: EXCELLENT (30-30 cum laude) if the student presents excellent knowledge of the topics, excellent property of technical language, strong ability on computational thinking, to choose the most appropriate constructs for modeling the automatic resolution of problems, excellent analytical ability and ability to apply knowledge; VERY GOOD (26-29) if the student shows a good command of the subject, full ownership of the technical language and ability to apply the knowledge to solve the problems; GOOD (24-25) if the student demonstrates having a basic knowledge of the main topics, good command of the language, limited ability to autonomously apply the knowledge for the solution of the presented problems and computational thinking; MORE THAN SUFFICIENT (20-23) if the student will demonstrate not to have full command of the main topics but a good understanding of them, satisfactory ownership of the language, lack of ability to independently apply the acquired knowledge; SUFFICIENT (18-19) if the student will present minimum basic knowledge of the main teaching topics and lack of technical language, minimum ability to apply the acquired knowledge; INSUFFICIENT if the student does not have an acceptable knowledge of the contents of the topics of the course and has not developed computational thinking and problem solving skills.
TEACHING METHODS	The course is divided into two modules of 30 video lessons each: - The "Artificial Intelligence and Machine Learning" module which has as its objective the knowledge of the basic principles of Artificial Intelligence and its applications - the "Data analytics and storage" module, aims to provide basic knowledge on the design and management of databases and on data analysis. In addition to the 30 video lessons, in the first module there will be 6 dedicated to the development of a software project. The second module, on the other hand, includes 6 video lessons on the use of database management programs and another 6 for the creation of in-depth studies At each lesson, the teachers will provide the slides and some self-assessment questions, to provide students with an immediate feedback tool on their learning

MODULE
DATA ANALYTICS AND STORAGE

Prof. GIUSEPPE MAZZOLA

SUGGESTED BIBLIOGRAPHY	
P. Atzeni, S. Ceri, S. Paraboschi, R. Torlone, Basi di dati – Modelli e linguaggi di interrogazione, McGraw Hill.	
AMBIT	50434-Discipline Informatiche
INDIVIDUAL STUDY (Hrs)	120
COURSE ACTIVITY (Hrs)	30
EDUCATIONAL OBJECTIVES OF THE MODULE	
The primary goal of the module is to provide the basic knowledge necessary for the design and management of a database and for data analysis using Data Analytics techniques.	

SYLLABUS

Hrs	Practice
6	Use of DBMS and experience in designing, creating and querying databases

Hrs	Workshops
6	Creation of in-depth papers on the topics of the course, to be carried out in groups or individually, with the support of the teacher.

Hrs	Frontal interactive teaching for distance courses
5	Introduction to Databases
5	Database Models
5	Database design
5	Relational Algebra
5	SQL query language
5	Data Analytics techniques

MODULE
ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

Prof.ssa ARIANNA PIPITONE

SUGGESTED BIBLIOGRAPHY	
Slides del corso, Risorse online,	
AMBIT	50434-Discipline Informatiche
INDIVIDUAL STUDY (Hrs)	120
COURSE ACTIVITY (Hrs)	30
EDUCATIONAL OBJECTIVES OF THE MODULE	
Knowledge of the basic principles of Artificial Intelligence and its applications Ability of defining an intelligent agent or a network configuration for solving particular classification or generation problems Knowledge of the basic ethical and transparency issues	

SYLLABUS

Hrs	Frontal teaching
1	Introduction and course presentation
1	The origins of Artificial Intelligence: the biological neuron and the artificial neuron. Historical background.
3	The perceptron and Python implementation.
1	The artificial agents, structures, and typologies. Basic cognitive functions.
6	Machine learning: training algorithms and kinds of learning.
8	Neural networks: types and applications. Implementation of a two levels neural network.
2	Ethics and explainable artificial intelliogence.
8	Neural network implementation by open-sources libraries

Hrs	Others
6	Project work aimed at creating a text/image classification program by using the most widespread libraries.