Titolo del corso: **An introduction to Data and Network Science: theories and applications**

Docente: **Dott. Enrico Corradini, Dott. Francesco Cauteruccio**

Ore frontali di lezione: **30**

Tipologia di corso: **Base**

SSD: **IINF-05/A**, **INF-01**

Modalità di verifica dell'apprendimento: **Progetto da sviluppare in autonomia**

Abstract del corso: This course provides an introduction to the fundamental concepts of Data Science and Network Science. No prior experience is required. The course will cover the theoretical foundations of data analysis and network science, starting from data processing methods to visualization and knowledge representation and extraction. Network science will also be introduced with a particular focus on representation and analysis of networks through the lens of graph theory. Basic concepts of Artificial Intelligence, particularly Machine Learning, will also be introduced. The theory will be applied using the Python programming language, with a focus on the most relevant libraries in this field.

Programma del corso:

Modulo 1: Theoretical foundations of Data Science (8 hours)

1. Introduction to Data Science
2. Data collection and processing methods
3. Data visualization and interpretation
4. Knowledge extraction from data

Modulo 2: Network Science (5 hours)

1. Introduction to Network Science
2. Algorithms on Networks
3. Topics in Network Science

Modulo 2: Theoretical foundations of Machine Learning (6 hours)

1. Introduction to Machine Learning
2. Supervised learning algorithms
3. Unsupervised learning algorithms
4. Model evaluation and validation

Modulo 3: Introduction to Python (5 hours)

1. Development environment
2. Basic programming concepts
3. Functions and modules

Modulo 4: Python for Data Science and Machine Learning (6 hours)

1. Fundamental libraries for Data Science
2. Data visualization with Python
3. Introduction to Scikit-Learn