**COURSE**

**ANALYS AND MANAGEMENT OF AGRONOMIC, FOOD AND ENVIRONMENTAL DATA IN MATLAB SSD:**

PHD COURSE: Food science and Sustainable Agricultural and Forestry Systems and Food Security

ACADEMIC YEAR: 2024/2025

**COURSE DESCRIPTION**

TEACHER: Paolo Nasta

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**GENERAL INFORMATION**

**SUGGESTED YEAR:**  II

**PERIOD**: from…November…to…December.

(indicate at least the month)

**CFU**: 6

**EXPECTED OUTCOMES** The main objective of this course is to code in Matlab in order to write scripts for advanced statistical analysis. The classes will be held in the computer science classroom or on Microsoft Teams. It is desirable to have knowledge in Excel, Statistics and Data Analysis. This class is useful for managing big data sets. This course is useful for students involved in projects requiring high skills in data analysis

**CONTENTS/SYLLABUS** Starting exercises in Excel (2 hours). Introduction to Matlab, basic operations with vectors and matrices (2 hours). Read, write and manage multiple files (in different formats), use of advanced functions for the manipulation of big datasets in environmental and food science (4 hours). Analysis of agro-environmental data and implementation of logical functions as IF, FOR, FIND(4 hours). Interpolation methods (2 hours). Calibration methods and validation of mathematical models (2 hours). Parametric optimization, linear fitting functions (2 hours). Elements of graphical visualization in 2D and 3D (4 hours). Multiple linear regression, principal component analysis and partial least-squares regression (PLS) (4 hours).

**READINGS/BIBLIOGRAFY** Lecture notes and other course materials

**TEACHING METHODS**

**Lectures hours: 6**

**Laboratory hours: 30**

**Seminars hours: 4**

**Other activities hours: 10**

**EVALUATION CRITERIA**

1. **Methods for acquiring eligibility**

X Written exam

* Oral exam
* Project discussion
* Other

1. **Evaluation pattern**

For the eligibility, a percentage of the attendance at the course of at least \_\_80\_% is requested.