



## A Deeper Dive into Spatial Analysis

<b>Calendari</b>	Wed, December 10th and Fri, December 12th, 2025, from 9 a.m. to 11 a.m. Wed, December 17th and Fri, December 19th, 2025, from 9 a.m. to 11 a.m.
<b>Durada</b>	8 hores
<b>Format</b>	Presencial, aula 24.013, edifici Mercè Rodoreda (campus de la Ciutadella)
<b>Llengua d'impartició</b>	Anglès
<b>Destinataris</b>	Personal docent i investigador i estudiants de doctorat de la UPF

### Ponent / Speaker

Dr. Marco Moderato (UPF)

Dr. Moderato is a Project Researcher in CASEs – UPF and he's currently a member of the Mapping the Archaeological Pre-Columbian Heritage in South America (MAPHSA) project. He completed his PhD in 2016 in Landscape Archaeology, and worked as a postdoc fellow at Chieti University (IT). His research interests range between GIS, settlement dynamics and spatial analysis, with a focus on the use and training on FOSS tools. He is member of several archaeological missions in India, France, Albania and the United Arab Emirates; he is also involved in historical and archaeological dissemination through the YouTube channel Accademia dei Pugni ([https://www.youtube.com/@Accademia\\_dei\\_Pugni](https://www.youtube.com/@Accademia_dei_Pugni))

### Objectius / Objectives

Upon successful completion of this course, students will have demonstrated the ability to:

- Apply advanced vector and raster analysis techniques to solve complex research problems in various fields.
- Use Geostatistics and spatial regression analysis tools to model and predict spatial phenomena.



- Conduct network analysis to examine connectivity and proximity relationships.
- Develop the ability to analyse spatial patterns and relationships . The course offers insights into various fields of study. It enables students to apply GIS (Geographical Information System) tools to explore historical events, economic trends, health data, biological data, and cultural phenomena.

## Continguts / Content

This course focuses on advanced methods and techniques of spatial analysis, with the aim of deepening the understanding of the spatial dimension of various types of data. Through a combination of practical exercises and case studies, participants will learn to manage and analyze geospatial data in more detail, exploring complex spatial patterns and relationships.

Topics to be covered include, but are not limited to:

### 1. Advanced Vector Analysis

#### o Network Analysis:

- Introduction and basic concepts (e.g., nodes, links).
- Calculating the shortest path and travel time (e.g., road networks).
- Least Cost Path analysis.
- Creating service areas (isochrones).

#### o Proximity and Advanced Overlays:

- Nearest neighbor analysis.
- Point-in-polygon and spatial joins.
- Site Catchment analysis.

### 2. Intermediate Raster Analysis

#### o Raster Algebra:

- Mathematical operations on rasters (e.g., calculating slope from a DEM).
- Change detection mapping.

#### o Georeferencing Avanzata:

- Reprojection and reclassification of raster data.

#### o Spatial Interpolation:

- IDW (Inverse Distance Weighting) interpolation.
- Introduction to Kriging.

#### o Basics of Remote Sensing

### 3. Geostatistics and Spatial Models

#### o Introduction to Geostatistics:



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- Concept of spatial autocorrelation.

Training dataset will be as general as possible in order to provide examples of applications in different fields of research. Discussion and planning of personal projects is a welcome follow-up to the course

## Metodologia / Methodology

- **Prerequisites:** Basic knowledge of QGIS and the fundamentals of spatial analysis.
- **Software requirements:** QGIS 3.xx (freely downloadable). Students must bring their own laptops.

This is a practical course in which students will learn various spatial analysis methods through a series of exercises and assignments. Participants will work directly with QGIS and different sets of training data to gain a comprehensive understanding of the concepts and principles.

Academic part is 30% and Practical part is 70%.

## Certificat / Certificate

Es rebrà un certificat del curs si s'acompleix l'assistència a totes quatre sessions, excepte per casos de força major.

Caldrà sol·licitar el certificat per **CAU**.

## [Formulari d'inscripció](#)