

**Course offered for the PhD program
in Civil, Chemical and Environmental Engineering
a.y. 2024/2025 (XL cycle)**

(course is open for participation of students from other PhD cycles or programs)

1. Title

Meteorological modelling and GNSS monitoring

2. Course Objectives and Description

The course provides the general ideas of the meteorological modelling and the contribution that GNSS measurements can provide through tropospheric monitoring.

Meteorology	GNSS
Troposphere effect on electromagnetic signal crossing the atmosphere	Introduction to the GNSS positioning Main GNSS networks and their applications
The equations of the Atmospheric Physics: phenomena described dynamically and parameterized phenomena	Elaboration of the GNSS networks, in particular for the tropospheric parameters estimation (ZTD) in respect to the positioning
Sensitivity of the equations to the initial conditions: the predictability problem and its consequences (practical and philosophical)	The punctual ZWD estimations coming from ZTD estimation and the modelled ZHD. The PWV estimation like a refresh/starting point of the meteorology model. Necessary data and their spatio-temporal resolution
Meteorological modelling chains: from the planetary scales to the local scale	The measurements of the meteorological radars, further technique to monitor the atmosphere
Analysis of extreme events Future research development	Applications to pilot cases of extreme events Future research development

3. Course Organization

The course consists of lectures and seminars.

4. Teachers

Francesco Ferrari and Ilaria Ferrando (information via e-mail francesco.ferrari@edu.unige.it and ilaria.ferrando@edu.unige.it)

5. Duration and credits

10 hours/2 credits

6. Activation mode and teaching period

Teaching period: spring 2024 (the definitive schedule will be arranged with students).

Periodicity: every two years.

7. Deadline for registration

Registration via e-mail (ilaria.ferrando@edu.unige.it and francesco.ferrari@edu.unige.it) in the starting of year 2025

8. Final exam

Critical presentation of scientific material proposed by teachers or coming from literature.