


# UE Atmospheric pollution: Principles and Experimental Methods

 ECTS  
6 credits

 Component  
UFR PhITEM  
(physique,  
ingénierie, terre,  
environnement,  
mécanique)

 Semester  
Printemps

- > **Teaching language(s):** French
- > **Open to exchange students:** Yes
- > **Code d'export Apogée:** PAX8ACAA

## Presentation

### Description

The aim of this module is to explain the chemical reactor that is the atmosphere, in order to describe the main types of pollution affecting it.

The first part of the course consists of reminders of the structure of the atmosphere and its composition, insisting on the diversity of this composition. The concepts of wells, sources and lifespan are also reviewed and illustrated by atmospheric examples where the lifespans are related to the transport times that can be observed in the different layers of the atmosphere. The importance of temperature inversion situations in the establishment of pollution episodes is illustrated with examples of pollution concerning, in particular, the Grenoble basin.

Subsequently, the means for quantifying the processes (deposits, chemical or photochemical reactions) responsible for elimination or formation of the main air pollutants are described: units, chemical and photochemical kinetics applied to the atmosphere, calculation of concentrations, etc.

Lastly, the different types of pollution to which the atmosphere may be subjected are addressed:

- The different types of air pollution episodes

- Regulatory concepts: ASQAA, information and alert thresholds, public regulatory measures, etc.
- Particulate pollution and public health aspects
- Acid rain and London smog
- Urban ozone pollution (photochemical smog)
- Ozone layer and ozone hole: an example of global pollution

The last course session prepares students for the 4-day mini-internship that takes place in the month of March. The objective of these four days is for the students, working in pairs or groups of three, to conduct measurements of some of the most representative pollutants in urban areas: ozone, nitrogen oxides and volatile organic compounds. Besides the measurements that may be carried out, our objective through this mini-internship is to raise awareness of the particularities and difficulties that can be posed by environmental measurements in general, and atmospheric measurements in particular. The procedure for carrying out the atmospheric sampling and analysis is explained to the students, who will then be free to define for themselves the questions they wish to answer with the measurements they take (many different ways of measuring a given pollutant).

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## Course parts

UE Pollution atmosphérique : principes et méthodes expérimentales - CMTD	Lectures (CM) & Teaching Unit (UE)	24h
UE Pollution atmosphérique : principes et méthodes expérimentales - TP	Practical work (TP)	24h

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## Recommended prerequisites

It is advisable - but not mandatory - to have followed the Organic Geochemistry UE in Semester 7. The chemistry knowledge required does not exceed that taught in high school or in the first year of the bachelor (licence).

**Period :** Semester 8

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## Additional information

Evaluation:

1 final exam score: 50%

1 minute of report (by binomial or trinomial) following the mini-internship: 50%

## Useful info



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## Contacts

Program director

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## Place

› [Grenoble](#)

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## Campus

› [Grenoble - Saint-Martin d'Hères](#)