Environmental monitoring and measurement devices

Air quality monitoring

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Outline

- Course's requirements and description
- Proposed subsection on Air Quality Monitoring: experimental approaches and related techniques
- Possible integrated laboratory activity
- Proposed CFU
- Proposed bibliography

Course's requirements and description

Environmental monitoring and measurement devices

Requirements
Bachelor degree in Biology, Geography or related Earth Sciences

Course description
The purpose of this curriculum is to familiarize students with modern concepts of environmental monitoring programs, methods of observation and surveillance, methods of sampling, field and laboratory measurements and principles of data analysis.

The students will learn how to:
design the sampling program,
take samples of different environmental media,
make some in situ measurement,
choose the relevant analytical method,
conduct statistical analysis of the obtained data,
assess the pollution level.

Air Quality Monitoring slot

- ❖Standard Methods → Passive samplers; Gravimetric techniques; Optical methods for particle counters; ….
- ❖Biomonitoring methods → Absorption Spectroscopy; Vacuum Filtration; SEM/EDX analysis; …
- ❖How to design a sampling campaign → Statistical replicates; Wind directions; Pollution sources; …
- ❖Statistical methods → Standard statistical analysis; Correlation; PCA, PLS… (see other course)
- ❖Field Campaign + Laboratory analysis + Pollution level assessment → **Estimating PM amount per surface leaf area by SED/EDX**; **Upscale by measuring the Leaf Area Index (LAI)**

Proposed CFU

- **Air quality monitoring techniques**

  2 CFU (≈ 16 hours)?

- **How to design a sampling campaign + Statistical analysis + Field and Lab activity**

  3 CFU (≈ 24 hours)?

Bibliography

❖**Standard air quality monitoring techniques**

Air Quality: Monitoring, Measuring, and Modeling Environmental Hazards, M. Ragazzi Ed., CRC Press (2016)

❖**Scanning Electron Microscopy and related Spectroscopy**

Principles and Practice of Variable Pressure/Environmental Scanning Electron Microscopy (VP-ESEM), D. J. Stokes, Wiley (2008). https://www.mobt3ath.com/uplode/book/book-43590.pdf