

ATM318 Aerosol measurement techniques (2020-2023)

HUOM! OPINTOJAKSOJEN TIETOJEN TÄYTTÄMISTÄ KOORDINOIVAT KOULUTUSSUUNNITTELIJAT HANNA-MARI PEURALA JA TIINA HASARI

- 1. Course title
- 2. Course code
- 3. Course status: optional
- 4. Course level (first-, second-, third-cycle/EQF levels 6, 7 and 8)
- 5. Recommended time/stage of studies for completion
- 6. Term/teaching period when the course will be offered
- 7. Scope of the course in credits
- 8. Teacher coordinating the course
- 9. Course learning outcomes
- 10. Course completion methods
- 11. Prerequisites
- 12. Recommended optional studies
- 13. Course content
- 14. Recommended and required literature
- 15. Activities and teaching methods in support of learning
- 16. Assessment practices and criteria, grading scale
- 17. Teaching language

1. Course title

Aerosol measurement techniques
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2. Course code

ATM318

Aikaisemmat leikkaavat opintojaksot 53174 Aerosolien mittaustekniikka, 5 op.

3. Course status: optional

-Which degree programme is responsible for the course?
Master's Programme in Atmospheric Sciences

-Which module does the course belong to?
ATM3001 Advanced Studies in Aerosol Physics (optional for Study Track in Aerosol Physics)

-Is the course available to students from other degree programmes?
Yes

4. Course level (first-, second-, third-cycle/EQF levels 6, 7 and 8)

Master's level, degree programmes in medicine, dentistry and veterinary medicine = secondcycle degree/EQF level 7
Doctoral level = third-cycle (doctoral) degree/EQF level 8

-Does the course belong to basic, intermediate or advanced studies (cf. Government Decree on University Degrees)?
Advanced studies

5. Recommended time/stage of studies for completion

-The recommended time for completion may be, e.g., after certain relevant courses have been completed.

Aerosol physics I

6. Term/teaching period when the course will be offered

The course will be lectured every year in the II period.

7. Scope of the course in credits

5 cr

8. Teacher coordinating the course

Tuukka Petäjä

9. Course learning outcomes

-Description of the learning outcomes provided to students by the course
- See the competence map (<https://flamma.helsinki.fi/content/res/pri/HY350274>).

The student will get basic information on the current techniques to measure atmospheric aerosol particles. Particular interest is placed on measurements of physical, chemical and optical properties, as well as aerosol hygroscopicity and volatility. The student learns the scientific basis of the instrument components.

10. Course completion methods

-Will the course be offered in the form of contact teaching, or can it be taken as a distance learning course?
-Description of attendance requirements (e.g., X% attendance during the entire course or during parts of it)
-Methods of completion

11. Prerequisites

-Description of the courses or modules that must be completed before taking this course or what other prior learning is required

12. Recommended optional studies

-What other courses are recommended to be taken in addition to this course?
-Which other courses support the further development of the competence provided by this course?

ATM319 Measurements of atmospheric aerosols: aerosol physics, sampling and measurement techniques

ATM320 Mass spectrometry in atmospheric sciences and environmental analysis

13. Course content

- Introduction to atmospheric aerosol measurements
- total aerosol number concentration (Condensation Particle Counters)
- aerosol size classification (Differential Mobility Analyzers)
- laboratory generation of aerosols and instrument verification
- measurements of aerosol hygroscopicity and volatility
- measurements of atmospheric ions
- aerosol optical properties
- on-line and off-line aerosol chemical measurements

14. Recommended and required literature

- Lecture notes

Supplementary reading material

- Hämeri, K. and Mäkelä, J. (2002) Aerosolien mittaustekniikka, moniste (in Finnish)
- Kulkarni, P., Baron, P.A. and Willeke, K. (Eds), Aerosol Measurement: Principles, Techniques, and Applications, Third Edition, 2011, Wiley. <http://onlinelibrary.wiley.com/book/10.1002/9781118001684>

15. Activities and teaching methods in support of learning

Exercises, group work in laboratory, student presentation based on the laboratory work.

16. Assessment practices and criteria, grading scale

Final grade is based on exam and exercise points. 45% of total points are required to pass.

17. Teaching language

English