ATM371 Laboratory Course in Aerosol Physics

1. Course title

Laboratory course in aerosol physics

2. Course code

ATM371

3. Course status: compulsory or 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
-Is the course available to students from other degree programmes?

yes

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

second cycle 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

Course is recommended for students during their late Masters studies or PhD studies. Ideally, the students should have basic knowledge of aerosol physics and aerosol measurement techniques. Knowledge of at least one data analysis software, such as MATLAB, Python, R or similar is necessary for the completion of the course.

Check course prerequisites below!

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

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

7. Scope of the course in credits

5 cr

8. Teacher coordinating the course

Rima Baalbaki

9. Course learning outcomes

At the end of the course, students should be able to:

- *Construct experimental setups and carry out calibrations/characterizations for selected instruments.*
- *Perform reliable measurements with selected aerosol instruments*
- *Apply theoretical knowledge in aerosol science and in programming to analyze gathered data during the laboratory works*
- *Interpret the results in a scientifically meaningful and proficient manner*

10. Course completion methods

The course consists of three lab works each spanning a period of two weeks. Each lab work consists of a lecture, a lab session (or more), a data analysis support session, an exercise set and a final report.

The student must:

- *Attend three compulsory biweekly (one every two weeks) laboratory sessions*
- *Submit three biweekly exercise sets*
- *Submit three lab reports at the end of the course*

All lab works must be passed to pass the course!

11. Prerequisites

Aerosol Physics I (FYS2071) and Aerosol Measurement Techniques (ATM318) or similar courses must be passed before participating in this course.

12. Recommended optional studies

13. Course content

The topics of the course or more specifically the instruments used in the laboratory sessions may vary yearly. For the past years, the course content has covered:

- *Aerosol particle number and size distribution measurements (DMPS and OPS).*
- *Sub 3 nm aerosol particle number and size distribution measurements (nCNC).*
- *Aerosol composition using aerosol mass spectrometry techniques (AMS).*
- *Designated calibrations and instrument characterizations.*
- *Respective data handling, analysis, and reporting.*

14. Recommended and required literature

Basic knowledge on aerosol measurement techniques can be read from books such as:

- *Hinds, Aerosol Technology: Properties, Behavior, and Measurement of Airborne Particles.*
- *Baron & Willeke, Aerosol Measurement: Principles, Techniques, and Applications.*

15. Activities and teaching methods in support of learning

The course is all about practical work where the students learn by doing in a project-based setting complemented with effective questioning. The course activities include attending lectures, performing group lab work, participating in group discussions and support sessions, solving exercises, and writing reports.

16. Assessment practices and criteria, grading scale

The course grade is the average grade from the three lab works. Each lab work is graded on a scale from 1 to 5. The grade is divided between the actual lab work, the exercises, and the final report. Grading matrices in the beginning of the course. The student must pass all three labs to pass the course.

17. Teaching Language

English