Postgraduate Environmental Physics (summer 2025):

Practical and Lecture

Introduction to Environmental Measurement Techniques / Space Lab 1

Last update: March 03, 2025

1) What is the aim of the practical?

The practical is an integral part of the lectures “Environmental Measurement Techniques / Space Lab 1”. The idea is to allow you to work with instruments used in environmental physics, to provide you with the basic skills needed in experimental work in our field and also to give you some insight into the work of the different groups at the institute.
For all experiments, some work will have to be done using different computer programs / programming languages. We expect you to write your reports using Word, LATeX, OpenOffice, or other word processors. Although this might be rather time-consuming, we consider it part of the curriculum.
Also, you will need to find additional sources of information for the individual experiments from books, publications in scientific journals, or the internet. Again, this often takes a lot of time but is an integral part of everyday scientific work.

2) How is the practical organised?

All the experiments will be performed in groups of two. At the beginning of the semester, you will have to form groups and can then choose from the available experiments. We try to accommodate all your wishes but might be forced to ask you to change your selection for organisational reasons. You will have to complete 4 lab experiments (2 experiments for Space Lab 1). During the first weeks of the semester, there will be lectures every Wednesday introducing the experiments' main concepts and some safety instructions. Afterwards, the experiments will take place – if not stated otherwise – on Wednesdays. Most of the experiments start at 10 a.m., but this has to be confirmed with the tutor when you contact them before the experiment (see below). How long the practical takes depends on the experiment and you, but you should usually be done before 5 p.m. on the same day.

A description of the experiment and some hints for the preparation can be downloaded from the Measurement Technique website. You should get a copy of the lab instructions and start preparing the experiment **at least TWO weeks** before the experiment. As we always try to improve things, we are grateful for any comments you may have on both the experiments and the descriptions and will try to incorporate your suggestions as rapidly as possible.

At least ONE week before the experiment, you should contact the tutor to make arrangements for the date and place of the experiments, and possibly a short preparation meeting and to have a first look at the apparatus.

At the beginning of each practical, you will be asked to answer questions on the basics of the experiment. If you are not well prepared, the tutor will send you home and fix a new date at their convenience, but hopefully, this will not be necessary. Together with the tutor, you will then go through the experiment and the first steps of the data analysis.

Reports

After the practical, you will have to write a report describing the fundamental motivation behind the experiment, the experiment itself, the data analysis and the results you obtained. You can write this report together, so only one report must be submitted per experiment.
The reports **have to be handed in to the tutor within TWO WEEKS after doing the experiment**. The tutor will then check your report, and if necessary, you will be asked to **correct it according to their comments within ONE WEEK**. The tutors will notify the organisers of the practical of your successful completion of the experiment and reports. All your reports need to be accepted before you can get the credits for this course.

The reports of the experiments should contain a description of the scientific background and the aim of the experiment, the experimental set-up, the experimental procedure and the results of your data evaluation with a discussion of the errors. Copy-and-paste from some internet sites is not an appropriate scientific literature research method and will not be accepted. The same holds for material copied from reports of other groups. AI tools may be used for information collection but not to wite the report for you.

If you fail to show up, are not prepared appropriately, fail to submit a report that can be accepted by the tutor, or if the revised report is still not accepted by the tutor, you will have to do an additional experiment at the end of the semester to fulfil the requirements for getting the credit points. There is only one date to do a further

experiment, and should you fail this one as well, you will not pass the lecture Measurement Techniques / Space Lab 1.

3) Final exam

After the end of the summer term (September 08 – 12 and September 15 – 19), there will be a final **oral 45-minute exam (30 minutes for Space Lab 1) that every student has to take individually.** All the things you have learned in the practical are considered part of the course and will therefore be part of the exam. For the first 15 minutes, you will be asked to give a presentation on an experiment of your choice on the blackboard (no slides, no notes). The rest of the exam will be questions on the four experiments (2 for Space Lab 1).

4) Do you have any questions?

If you have specific questions about one of the experiments, please get in touch with the corresponding tutor. If you have more general questions, please contact

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5) Check the measurement Techniques web page:

http://www.msc-ep.uni-bremen.de/services/lectures/Measurement_tech_SS25.html