

Postgraduate Environmental Physics (summer 2019):

Practical and Lecture

"Introduction to Environmental Measurement Techniques"

Last update: March 31, 2019

1) What is the aim of the practical?

The practical is an integral part of the lecture "Environmental Measurement Techniques". The idea is to give you the opportunity to work with instruments actually 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, and we expect you to write your reports using Word, L^AT_EX, OpenOffice or some other word processor. Although this might be rather time consuming, we consider it to be part of the curriculum.

Also, you will need to find additional sources of information to the individual experiments from books, publications in scientific journals or from the internet. Again, this often takes a lot of time but is an important 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. In total you will have to complete 4 lab experiments (2 experiments for SpaceLab). During the first 4 weeks of the semester, there will be lectures every Wednesday introducing the main concepts of the experiments and also 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 him/her before the experiment (see below). How long the practical takes depends on the experiment and also on you, but usually you should be done around 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** in advance of the experiment. As we always try to improve things, we are grateful for any comments you 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 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 his/her convenience, but hopefully this will not be necessary. Together with the tutor, you will then go through the experiment and also the first steps of the data analysis.

Reports

After the practical, you will have to write a report describing the basic 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 needs to 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 his or her comments within ONE WEEK**. There is a special report form that accompanies you through the semester and the review process. This form will be given to you at the last lecture on April 24 and will have to be signed by each tutor when you have done your experiment, when you hand in the report and when the report is finally accepted. Please **bring this form to your oral exam** as you need to pass all practicals and the oral exam to get the credits for the Measurement Techniques.

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 site is not an appropriate scientific method of literature research, and will not be accepted. The same holds for material copied from reports of other groups.

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 an extra

experiment and should you fail this one also, you will not pass the lecture Measurement Techniques.

3) Final exam

After the end of the summer term (date: August 13 – 16, 2019) there will be a final oral 45 minute exam (30 minutes for SpaceLab) that every student has to take individually.

All the things you have learned in the practical are considered part of the lecture and will therefore be part of the exam. The first 15 minutes you will be asked to give a presentation on an experiment of your choice at the blackboard (no slides, no notes). The rest of the exam will be questions, mainly on the 4 experiments (2 for SpaceLab) that you did but also on the lectures from the first weeks of the course.

4) Do you have any questions?

If you have specific questions to one of the experiments, please contact 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_SS19.html