

1 Welcome to the AP!

This course is intended for students of first and second semester. As an assistant for the AP (short for 'Anfängerpraktikum Physik', beginners practical course in experimental physics) you will be assigned to one or more experiments for which you will be responsible during the semester in terms of feasibility and conditions.

Futhermore, you will have to assist the students to execute your experiment(s) and help them write their lab reports. Therefore, if you are assigned to a new experiment, you have to do the experiment(s) at least once, to be familiar with its tricks and flaws, be able to verify its reliability and be able to explain it to the students properly.

Please read this handout carefully. If you have any questions do not hesitate to contact the organizer of the AP in person or via email c.meier@unibas.ch.

2 Here we are

The labs of the AP are not in the physics department, but relocated at **Uferstrasse 90 in Basel** (see Figure 1). It is situated between the freight yard and *Rhine* river.

The fastest way to get there is by bicycle, but you can also use public transportation or walk.

Public Transportation	40 min	Walk to «Kannelfeldplatz» and take tram nr. 1 to «Dreirosenbrücke», change there to tram nr. 8 to «Kleinhüningen», then roughly 10 min by foot along river <i>Wiese</i>
Bicycle	15 min	From the physics department follow the «Rheinradweg» towards the Netherlands until river <i>Wiese</i> , then turn left



Figure 1: Route to Uferstrasse 90. Tram nr. 1 from «Kannelfeldplatz» to «Dreirosenbrücke», change to tram nr. 8 to «Kleinhüningen», then roughly 10 min by foot along the river *Wiese*.

3 Duties before the semester starts

- Please get an **access badge** to Uferstrasse 90 from our custodian Bernd Heimann.

office Physics department, 3rd floor, next to the mensa
phone 061 207 37 02
email bernd.heimann@unibas.ch

It can happen that you are the only assistant at Uferstrasse 90 on a specific date so please make sure you have an access badge before the semester starts.

- Download the newest version of the manual of your experiment(s). You find them on our homepage <https://ap.physik.unibas.ch/versuche.php>. Read the manual carefully.
- If you are assigned to the **same experiment** you had in the previous semester, please go to Uferstrasse 90 and check the experiment before the semester starts. Is everything working properly? No material missing or broken? Are there enough consumable supplies for the whole semester (i.e. ethanol, gas, conducting paper, plastic gloves)? Then write an email to c.meier@unibas.ch no later than **Monday, March 4th, 2024**, either with a list of problems, or to confirm that everything is ready.
- If you are assigned to a **new experiment**, or if you do AP for the first time, please go to Uferstrasse 90 and perform your experiment(s). Do all the tasks the students have to do following the manual(s) and write down the measurement data. There will be time to do this after the *AP Welcome Event*. Moreover, do a complete evaluation of your measurement data including plots, error calculation, and interpretation. Then write a short report including
 - plots and calculations
 - conclusion and interpretation
 - measurement data
 - list of problems with your experiment if there were any (i.e. missing or broken material, parts in the manual that are not clear or should be changed) - otherwise state that everything is fine

In contrast to the students your report does not need to have a title page, introduction, theoretical part, or description of the experimental setup.

Please send your report no later than **Friday, March 8th, 2024** to c.meier@unibas.ch.

- In case that there were any Monday, Tuesday or Wednesday afternoons during semester time where you do not have time to supervise experiments (i.e. because of conferences, group meetings, holidays) please write an email to the organizer of the AP (c.meier@unibas.ch) before **Monday, February 26th, 2024**. Thanks for your cooperation!

4 Duties during the Semester

4.1 Schedule

Students will be assigned to your experiment(s) on a schedule, published at the end of the first week of the semester. You will get an email as soon as the schedule is online.

The experiments take place on Mondays, Tuesdays, and Wednesdays between 13:00 - 17:00 (part I) and 13:30 - 17:00 (part II), respectively, at Uferstrasse 90 (see Figure 1). On the homepage of the AP there is an internal area <https://ap.physik.unibas.ch/internal.php>, where you can **login** with your official login-data from Basel University (email account). Here you find the schedule for the semester and you can download the lab reports written by the students.

You only have to be at Uferstrasse 90 on the dates where you have some students assigned to your experiments. Please be aware that the schedule may change during the semester.

4.2 Students performing an experiment

On the dates of the assigned experiments you have to be present in the lab at Uferstrasse 90 (see section 2). You can bring some work if you like, but you have to stay in the vicinity of the lab while your students are performing the experiment.

Your job is the following:

- Please always arrive 5 min earlier than your schedule tells you. We want to exemplify the punctuality we expect from the students;
- Test the preparation of the students and check whether they have informed themselves about the experiment or not. The question-section of the introduction of the manual serves as a basis for some questions;
- Discuss the theoretical background and explain the experimental setup to the students such as they are able to perform the experiment themselves;
- You should be **helpful** to the students going through the experiment and stand for questions and instructions. The students may not leave until they understand the experiment and know what they are expected to do for the evaluation;
- The students must record the measured data in a journal/notebook, which has to be signed by you on the same day (official stamp, signature and date);
- Ensure that the students have cleaned up their workspace and the whiteboard;
- Correct the lab reports of the students following the guidelines in subsection 4.5.

You can enjoy coffee and tea for free! But please wash your mugs after usage, dry them and bring them back to the place where you found them - thank you.

4.3 Deadlines for students

After performing an experiment, the students have to write a lab report. Therefore, they have two important deadlines to follow:

- They have to hand in an entire version of the protocol (see subsection 4.6) no later than **two weeks** after the day of the experiment. These protocols may contain some mistakes, but all the mandatory sections of the protocol have to be complete. If there are any missing parts in the protocol after the first due date please mark them in the schedule as failed.
- The protocol needs to be complete and flawless no later than **four weeks** after the day of the experiment. If the lab report is good, please check the <accepted>-button in the schedule on the homepage. Otherwise mark it as failed.

In exceptional cases students can ask for an extension of those due dates. You can grant them up to 7 days. Time extensions shall only be given on request - do never prolong deadlines unless students ask you to do so. Moreover time extensions shall only be granted if there is a plausible explanation and the students ask early enough (i.e. a week in advance). If the students need a time extension of more than 7 days they have to email c.meier@unibas.ch.

4.4 Deadlines for assistants

We demand high reliability of our students, so please lead by example. When the students upload a lab report you will receive an email. Please correct the lab report following the subsection 4.5 within **three working days**. As <working days>, we define Monday to Friday without public holidays. If for example a student uploads a protocol on Wednesday evening at 8 pm, Thursday counts as the first working day, Friday is the second and you should finish your corrections no later than Monday evening. If you exceptionally can not correct the lab report within three working days (i.e. because of sickness), please send an email to the students and explain the situation (cc to c.meier@unibas.ch).

4.5 Corrections of the lab reports

Students can work together in pairs of two. Groups of more than two students are not possible. The students can independently write their own separate protocols, but it is sufficient for them to hand in one protocol per group. It is expected that both students understood the experiment and worked on the evaluation.

Moreover, for IT reasons **both students have to upload the protocol** in their personal internal area on the AP homepage even though they hand in the same lab report. In case of any corrections please check that both students re-uploaded the newest version of their protocol.

For the corrections of the lab report, the following guidelines should be considered:

- First submission of the lab reports after two weeks must be complete (see subsection 4.6);
- The information and rules of the procedures given to the students can be found on the AP website <https://ap.physik.unibas.ch>. Together with the questions from the lab manual, this content can serve as a reference for the content of the final lab report;
- In general, the corrections of the lab report should be written in an email or directly into the *.pdf file and sent to the students. A verbal correction may also be done, but should always be connected with written notes as well;
- By the second correction, the list of points to correct should not be extended;
- Spelling mistakes must only be corrected if the content of the lab report is not comprehensible;
- Please also comment on the length of the students lab report if it is longer than required.

4.6 Content of the protocols

A complete lab report contains:

- A *front page* containing the following elements:
 - Name of the course;
 - Abbreviation and name of the experiment (i.e. IU2 Gravitationskonstante);
 - Date when the experiment was carried out;
 - Names of both students;
 - Name of the assistant;
 - Expenditure of time for the lab report in hours (incl. evaluation and writing);
 - Declaration on scientific integrity:

Hiermit erklären wir, dass diese Ausarbeitung von uns selbständig angefertigt wurde und keine Kopie (auch nicht auszugsweise) einer schon bestehenden Ausarbeitung ist. Uns ist bekannt, dass bei Nichtbeachtung der entsprechende Versuch wiederholt werden muss. Weiterhin erklären wir, über die Regularien des Anfängerpraktikums in Kenntnis gesetzt worden zu sein und diese Regularien zu berücksichtigen und zu akzeptieren. Uns ist auch bekannt, dass wir bei groben Regelverstößen und/oder wissenschaftlichem Fehlverhalten aus dem Anfängerpraktikum ausgeschlossen werden können.

- *Introduction* with the purpose of the experiment in a few sentences (abstract);
- Summary of *theoretical background* in own words (in brief, not a copy of the manual, but a summary of the essentials needed to explain this experiments measurements, including important formulas);
- Description of the *experimental setup and procedure*;

- *Evaluation* part with neatly display of the measurements, readings and assumptions as well as comprehensible calculations. **Please note that every determined observable has to have a proper error estimation with systematic and/or statistical error propagation;**
- *Conclusion* with the final results and a critical discussion in a few sentences, including a comparison to a literature value;
- Complete index of *references*;
- Measurement data in the attachment.

The students can work in groups of two. They have to hand in at least one lab report per group, but both students have to upload it in the internal part of the AP website. It is essential that the submitted lab report was their own, autonomous work:

- It is not a copy of someone else's work;
- It is the work of not more than two students;
- Both students can explain the experiment and the content of their work;
- The content of the lab report is written understandably to the assistant.

4.7 Reasons to fail a student

An experiment has to be marked as failed, when the student

- does not appear on the assigned experiment day;
- is insufficient prepared for the experiment (i.e. can't answer reasonable questions);
- is not following the first submission deadline of two weeks;
- is not following the final submission deadline of four weeks to hand in a final version, that can be accepted by the assistant.

In this case please mark the student as failed by checking the failed checkbox in the schedule on the website of the AP on the same day.

5 Duties after the semester

- Send an email to c.meier@unibas.ch to inform about the general condition of your experiment(s), i.e. missing or broken parts, consumable supplies and so on. Any ideas to improve your experiment(s) are very welcome!
- If you hand over the experiment to another assistant please take some time to help and explain.

6 Outlook

After successfully passing the experiments the students have to take an oral exam. The goal of this exam is to test that the students understand the experiments and their evaluations.

Moreover, the exam should make sure that both students of the group participated in the analysis part, so both are able to explain what they did.

Please be strict on correction and deadline. This will help to have much less trouble and discussion. If you have any questions please contact me via email c.meier@unibas.ch. Thank you for your efforts! ☺

All the best,
Christian Meier