

# Seminar Requirements: Numbers and Theory

You shall prepare two handouts and give one talk. In the following we give rules and advice to prepare your seminar.

## Choice of subject and meetings

- Each group of two students chooses a chapter from the book *Der Zahlenteufel*. We want you to find out a subject of Number Theory treated in that chapter, pick two theorems and thoroughly study and understand their proofs. This subject must be presented once at the level of university students and once at the level of Gymnasium pupils. For the students at university level the theorems have to be presented with proofs, for the pupils at Gymnasium level the topic can be explained without proofs.
- Each group has to present different theorems and this choice has to be discussed with the assistant.
- Other references for the seminar are *An Introduction to the Theory of Numbers* by Hardy and Wright, and *A friendly introduction to number theory* by Silverman.
- The chosen subject has to be communicated in written form to the assistant Maria Hempel by **February 28<sup>th</sup>**. Subjects have to be approved by Prof. Viada. The subjects for the first two weeks will be discussed in the first meeting.
- The groups have to meet and discuss with the assistant according to the official schedule.

## PART A: Handout for a lecture at university level

This handout should be a teXed PDF file and be organized as follows:

- An abstract; these are 5 - 10 lines that sum up in a few words the subject.
- An introduction;  $\frac{1}{2}$  - 1 page that puts the subject into a context and gives the main results.
- A main section; 3 - 4 pages that give all the necessary definitions and propositions, states the two main theorems and gives completely self-contained proofs. All the proofs have to be worked out, be well formulated and well structured. It is not sufficient to copy them from somewhere. Every detail about both theorems has to be understood by both members of the group.
- A section of examples and applications; 1 - 2 pages that give important examples and/or the most important applications.
- A section of references; every thing that has been used such as books, articles, or webpages has to be properly cited. Theorems from Wikipedia could contain

mistakes. You are responsible for the correctness of your proofs.

## **PART B: Handout for a lecture for Gymnasium level pupils**

This handout should be a `TeX` PDF file and be organized as follows.

- An introduction;  $\frac{1}{2}$  a page explaining to the pupils the interest of the subject.
- A main section; at most 1 page that explains the main idea and explains the subject in a clear and interesting way.
- Examples and exercises; give a list of examples and exercises that the pupils should look at and solve to understand the subject.
- Give a reference where the pupils can read the subject.

## **Give a talk**

The talk shall be structured as follows.

- The first 10 minutes: the first person presents PART B, make sure to highlight the main idea.
- Then, during 30–35 minutes, the second person gives an introduction and proves the first main theorem of part A, with some examples and applications.
- Break
- The first person proves the second main theorem, and gives some examples and applications.
- Questions are posed during and at the end of the talks.
- Both students must be able to answer questions on the whole topic.

## **Deadlines and Credit Points**

All deadlines, as fixed in the official schedule, are mandatory and cannot be postponed. The handouts have to be handed in in time. That is usually 10 days before the date of the talk and in general as fixed in the official schedule. To get permission to present the talk, the handout must be approved and deemed sufficient by Prof. Viada. Obtaining the credit points is subject to the approval of Prof. Viada of the handouts, talk and answers to questions.

## **Email Adresses**

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