

Math. 523

Group Theory I

The goal of this course is to give a solid introduction to basic concepts of Group Theory. The main textbook for the course is the second edition of **A Course in the Theory of Groups** by Derek J. Robinson. Note however that even though most of the material introduced in class can be found in this book, the presentation of the results and the order in which they are introduced in class will sometimes be different from the approach taken in the book. The students are strongly encouraged to consult other sources related to the topics discussed in class. Among them I strongly recommend the following:

- M. I. Kargapolov, Yu. I. Merzljakov, **Fundamentals of the Theory of Groups**, GTM 62, Springer-Verlag, New York-Berlin, 1979.
- J. L. Alperin, R.B. Bell, **Groups and Representations**, GTM 162, Springer-Verlag, New York, 1995.
- M. Aschbacher, **Finite group theory**, Second edition. Cambridge Studies in Advanced Mathematics, 10. Cambridge University Press, Cambridge, 2000.
- P. de la Harpe, **Topics in Geometric Groups Theory**, Chicago Lectures in Mathematics. University of Chicago Press, Chicago, IL, 2000.
- John D. Dixon, **Problems in Group Theory**, Dover Pub. Inc., New York 1973.

During the semester students will be expected to solve numerous homework problems. These problems will be designed to broaden the theoretical

material introduced in class and to help the students to master the techniques of the topics discussed in class. It is my belief that the best way to learn mathematics is to do mathematics (i.e. to work on numerous interesting problems). It is therefore of vital importance that the students work systematically on the assigned problems. One of my teachers used to say that even if one does not solve a good problem, one learns a lot just by trying various attacks on it. I hope that at least some of my problems will be good. The main textbook and the books listed above contain numerous exercises, many of them of rather simple nature. In addition to the homework problems, I strongly suggest to work on as many of these exercises as possible.

The students are allowed (even encouraged) to work on the problems in small groups, but the solutions should be written by each student separately.