

Math 400c, MWF 12:00, E 206

Lecturer: Alexander Hulpke, Weber 217

Office Hours: MTF2, W3 preliminary. See <http://www.math.colostate.edu/~hulpke/officetimes.html>

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Textbook: I do not formally require you to have a textbook (homework will be handed out), though you might want to have a book to read up on the material at home. The course will loosely follow:

R. Kumanduri and C. Romero, Number Theory with Computer Applications, Prentice-Hall, ISBN 013801812. (about 100\$)

Alternative: G. Andrews, Number Theory, Dover. ISBN 0-486-68252-8 (about 11\$)

Topics

- Divisibility and Prime Numbers
- Linear Congruences
- Euler's φ -function and other multiplicative functions
- Primitive Roots
- Number Theoretic Algorithms: Primality Tests, Factorization, Discrete Logarithm
- Quadratic Congruences
- Distribution of Primes
- Gaussian Integers
- Outlook on Modern Number theory

This corresponds to chapters 1-4,7 and parts of chapters 5,6,9,12,14,16 and 19 of Kumanduri's book.

The pace will be roughly one section per lecture. Please let me know if this turns out to be too fast (or too slow).

Grades

will be based on homework (about 70%) and one final exam (30%). I also expect to see you regularly in class and to hand in solutions to at least half of the homework problems.

Homework

Homework will be handed out every monday in the lecture, and is due at the start of the lecture of the wednesday of the following week. Late homework will be accepted only if the delay is due to reasons beyond your control.

If the amount of homework seems to be unreasonable, please let me know.

Due to time restrictions, only to some of the problems can be treated in class, but I'm happy to go through any problems in my office hours.

Computer use

Some homework problems will involve calculations that would be tedious to do by hand or with a simple pocket calculator. For these we will use a computer algebra system. While you are welcome to use any system (such as Maple or Mathematica) you are already accustomed to, I will give examples in the system GAP. This program is installed on the PCs in the Mathematics lab. If you want to install it on your home PC (Linux/Windows/Mac) you can either download the program from <http://www.gap-system.org> or borrow a CD-ROM from me. (You won't be examined about the use of this program.)

To use the computers in the Lab (Weber 205/206) make sure the domain is set to MATHSTAT, the user name is m400c, the password will be given in the lecture.

The first homework sheet contains a gentle introduction to the basics of GAP.

I wish you success with this course and all the best for the coming semester.