

MA522: Introduction to Computer Algebra, Fall 2017

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Syllabus

Course website: www.math.ncsu.edu/~aszanto/MA522

Instructor

Dr. Agnes Szanto
SAS Hall 4120
Tel: 515-7547
E-mail: aszanto

Meet

T-Th 11:45am-1:00pm
SAS Hall 1218

Office Hours

T-W 3:00PM-4:00PM
or by appointment

Course Prerequisites

C or better grade in: (MA 407 or MA 521) and (MA 405 or MA 520) or permission from instructor

Goals and Objectives

Basic techniques and algorithms of computer algebra. Integer arithmetic, primality tests and factorization of integers, polynomial arithmetic, Euclidean algorithm, resultants, Groebner bases, solution of polynomial systems, polynomial factorization.

Textbook

Joachim von zur Gathen and Juergen Gerhard: Modern Computer Algebra, Cambridge University Press, 1999, 2003 or 2013.

Recommended books

Thomas H. Cormen et al. "Introduction to Algorithms", 2nd or 3rd edition, MIT Press

David Cox et al. "Ideals, Varieties and Algorithms", Springer 1996 or 2006

Topics and estimated weeks allocated to each topic

Algorithms and complexity: 2 weeks
Symbolic vs. Numerical computation: 1 week
Polynomial division & Euclidean algorithm: 1 week
Chinese remainder: 1 week
Interpolation: 1 week
Fast linear algebra: 1 week
Fourier transform: 1 week
Resultants and subresultants: 1 week
Polynomial ideals, membership: 1 week
Groebner bases: 2 weeks
Projects: 1 week

Important! Students should read the next chapter in the book before coming to class

Tentative schedule of homework due dates, quizzes and tests

Class work and homework is going to be in groups of 3-4 students. The group assignment will be voluntary at the beginning, but during the semester I will re-assign the groups.

The grade will be given on the basis of successful completion of homework assignments, the 2 in class tests, and a final project.

Homework assignments are given approximately every two or three weeks, and will be posted (with deadlines) under "Assignments" on the course website. The homework is a group assignment.

The test schedules can be found under "Schedule" on the course website. Practice tests will be available under "Tests".

The project will involve giving a *written essay* and a *poster presentation* of a recent paper or chapter from a book, which will be selected by the student subject to the approval of the instructor. Poster presentations of the projects will take place during the last week of classes and maybe the time scheduled for the final exam. More information, together with important dates, can be found under "Projects" at the website.

Determination of grades: + and - system

Prereq Test 10%
Homework: 20%
In class Test 1: 25%
In class Test 2: 25%
Final Project: 20%

Letter grade is according to the following:

A+ = 99-100, A = 92-98+, A- = 90-91+, B+ = 88-89+, B = 82-87+, B- = 80-81+,
C+ = 78-79+, C = 72-77+, C- = 70-71+, D+ = 68-69+, D = 62-67+, D- = 60-61+

Policy on incomplete grades and late assignments

Homework will be assigned and collected once every two or three weeks. It is the students' responsibility to do the homework. For the homework problems, check the course website. **Late homework will NOT be accepted, since I may hand out solution sets on the due date.**

Policy on absences (excused and unexcused) and scheduling makeup work

Students are expected to arrive on time, to contribute to group work and class discussions, and to stay until the class ends. Attendance at all meetings of the class is expected. Occasional absences will be approved if they meet University policy (see University policies).
There are no make-up exams. Missed tests are not allowed unless an official written (medical, legal) excuse is presented before the test or in emergency cases at most one week after the test.

Class evaluation

Online class evaluations will be available for students to complete during the last two weeks of class. Students will receive an email message directing them to a website where they can login using their Unity ID and complete evaluations. All evaluations are confidential; instructors will never know how any one student responded to any question, and students will never know the ratings for any particular instructors.

Evaluation website:

<https://classeval.ncsu.edu>

Supporting Fellow Students in Distress

As members of the NC State Wolfpack community, we each share a personal responsibility to express concern for one another and to ensure that this classroom and the campus as a whole remains a safe environment for learning. Occasionally, you may come across a fellow classmate whose personal behavior concerns or worries you. When this is the case, I would encourage you to report this behavior to the NC State Students of Concern website:

<http://studentsofconcern.ncsu.edu/>

Although you can report anonymously, it is preferred that you share your contact information so they can follow-up with you personally.

Academic Integrity Statement:

Students are expected to follow university guidelines available at
http://www.ncsu.edu/policies/student_services/student_discipline/POL11.35.1.php

NC State policy on working with students with disabilities:

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with Disability Services for Students at 1900 Student Health Center, Campus Box 7509, 515-7653. For more information on NC State's policy on working with students with disabilities, please see the Academic Accommodations for Students with Disabilities Regulation (REG02.20.1) ([link](#)).