



# FSF3602 Cohen-Macaulay Rings

## 7.5 credits

Cohen-macaulayringar

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

### Establishment

Course syllabus for FSF3602 valid from Spring 2011

### Grading scale

### Education cycle

Third cycle

### Specific prerequisites

A Master degree including at least 30 university credits (hp) in Mathematics.

Advanced courses in commutative algebra, algebraic geometry and combinatorics.

### Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

### Intended learning outcomes

After the course, the student should have obtained sufficient depth in the field order to be able to use this knowledge in research in commutative algebra, algebraic geometry and algebraic combinatorics. In particular, this means that the student should be able to use Cohen-Macaulay rings in applications in for example algebraic geometry and combinatorics.

## Course contents

- Regular sequences, grade, depth and projective dimension.
- Graded rings and modules
- Koszul complexes and Koszul homology
- Cohen-Macaulay rings and modules
- Regular rings, normal rings and complete intersections
- Canonical modules and Gorenstein rings
- Structure theorem for Gorenstein rings of codimension three
- Hilbert functions, Macaulay's theorem and Green's theorem
- Stanley-Reisner rings, Hochster's theorem, the upper bound theorem and Gorenstein complexes

## Disposition

Seminars and problem solving sessions.

## Course literature

Cohen-Macaulay Rings by W. Bruns and J. Herzog

## Examination

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

The students are required to present the material of the course in lectures and to solve problems.

## Other requirements for final grade

Approved assignment /presentation.

## Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.