MMA310  Galois Theory

7.5 higher education credits

Second Cycle

This syllabus is the binding document.

1. Confirmation

The syllabus was confirmed by the Department of Mathematical Sciences on December 1, 2007 to be valid from December 1, 2007. The syllabus is revised on February 22, 2010 to be valid from July 1, 2010.


2. Position in the educational system

The course Galois Theory, 7.5 higher education credits, is one of several single subject courses included in the Masters Program in Mathematical Sciences. The course is also open for eligible students outside the program. It is further one of the courses in the post-graduate program in Mathematics.

3. Entrance qualifications

The prerequisite for the course Galois Theory is the equivalent of 90 higher education credits in Mathematics, including the course MMG500 Algebraic structures.

4. Course content

Prime fields, characteristic of a field, algebraic extensions, splitting fields, finite fields, automorphisms of fields, Galois groups, normal extensions, separable extensions, Galois extensions, solubility of equations, geometric constructions.

5. Learning outcomes

After completing the course, the student will

- be able to determine the splitting field of a polynomial
- know Dedekind’s lemma on field automorphisms
- understand the relation between intermediate field extensions of a Galois extension and subgroups of its Galois group
• be able to decide when a polynomial equation is solvable by radicals by means of its Galois group

• know about applications of Galois theory to geometric constructions with ruler and compass.

6. Required reading

List of required reading enclosed.

7. Assessment

An examination will be given at the end of the course. A student who has failed a test twice has the right to change examiner, unless weighty arguments can be invoked. For this, the student must send a written request to the board of the department.

8. Grading scale

The grades are Fail (U), Pass (G), and Pass with Distinction (VG).

Students who are contractually entitled to ECTS grades should inform the examiner about this no later than one week after the start of the course.

Students without such entitlement will not be awarded ECTS grades. Grades will be converted into ECTS terminology according to a standard model approved by the University President.

9. Course evaluation

Oral and/or written course evaluation will be performed. The results of the evaluation will be communicated to the students and will serve as a guide for the development of the course.

10. Additional information

The language of instruction is English unless all involved are Swedish speakers.