

**GALOIS THEORY, SF2732  
COURSE PM  
SPRING 2013**

1. COURSE PLAN

1.1. **Goals.** After the course, the student is expected to:

- be familiar with ways of constructing field extensions,
- identify and describe fundamental properties of separable, normal, and Galois field extensions,
- be able to calculate Galois groups of certain standard field extensions,
- be familiar with the fundamental theorems of Galois theory, including their proofs,

1.2. **Content.** Field extensions, separability and normality, Galois groups, finite fields, solutions of polynomials.

1.3. **Prerequisites.** Recommended SF2729 Groups and rings.

1.4. **Examination.** One written exam, and four homework assignments (two during each part of the course) Grade scale A, B, C, D, E, Fx, F.

1.5. **Literature.** *Algebra* by Serge Lang, published by Springer-Verlag.

2. ACTIVITIES

During the lectures we will discuss the theoretical material and examples. Part of the lectures will be devoted to exercise sessions. Apart from this, it is important that the students take the time to study the material on their own and to practise problem solving.

3. EXAMINATION

3.1. **Homework assignments and final exam.** The course consists of two parts. Both parts consists of 8 lectures. There will be four homework assignments, two during each part of the course; each homework can give up to 3 credits. The final exam consists of six problems, each of which can give up to 6 credits. The score from which the grade will be decided will be the better of the exam and a weighted average of the exam and the homework, where the exam is given weight  $2/3$  and homework  $1/3$ . In short,  $\text{score} = \lceil \max(x, 2x/3 + h/3) \rceil$ , where  $x$  is the score on the exam and  $h$  the number credits from the homework.

In order to pass the exam, a minimum of 18 credits is required. The grade Fx will be given for 16 or 17 credits. It can be upgraded to E by fulfilling an additional requirement, e.g., passing an oral exam.

The minimum requirements for the various grades are according to the following table:

<b>Grade</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
Total credit	30	27	24	21	18

Again, to obtain grade A or B, it is required to score at least 5 points on each of at least 6 homework assignments of each of the two parts of the course.

3.2. **Reexamination.** There will be a possibility to retake the final exam in August. Information about the date and location will be available before the end of the course. The deadline for registration for this exam will be two weeks before the exam.

3.3. **Allowed aids.** No aids are allowed during the final exam. The homework assignments should be made by the student her- or himself. No copying from other students or from other sources is allowed. Collaborations should be clearly stated.

3.4. **Rules for exams and homework assignments.** In all examination the KTH rules for examination apply (cf. [www.kth.se](http://www.kth.se)).

3.5. **Written presentation.** In the grading of all written examination, including the written exam and the homework assignments, the level of the presentation of the written solutions will determine part of the grade. This holds in particular for explanatory text.

#### 4. ADMINISTRATION

4.1. **Contact information.** The following teachers and administrative personnel are involved in the course:

	<b>Name</b>	<b>email</b>	<b>telephone</b>
Lecturer and Examiner	Wojciech Chachólski	<a href="mailto:wojtek@kth.se">wojtek@kth.se</a>	08-790 71 33
Lecturer	Tilman Bauer	<a href="mailto:tilmanb@kth.se">tilmanb@kth.se</a>	08-7907417
Course Secretary	Rose-Marie Jansson	<a href="mailto:jansson@math.kth.se">jansson@math.kth.se</a>	08-790 72 01

Observe that the course secretary only deals with questions regarding registration and reporting of results.

4.2. **Course web page.** On the web page of the course, all relevant information about the course will be found.

*URL.* <http://www.math.kth.se/math/GRU/2012.2013/SF2732/index.html>

#### 5. TIME BUDGET

The course corresponds to a workload of 7.5 ECTS credits, which means 10 hours a week during the whole semester. In total, about 160 hours.