Algebra for PhD students
Spring 2022

Lecturer

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Webpage

All handouts will be available at `http://www2.math.uu.se/~martinh/phdalgcourse/`

Litterature

There is no specific literature for the course. Handwritten notes will be shared as handouts
after each lecture. Two books that may be of use are:

Grillet, Pierre Antoine
Abstract Algebra,
Springer, 2007.

Atiyah, Michael and Macdonald, Ian Grant
Introduction To Commutative Algebra,
Addison–Wesley, 1969.

Preliminary Schedule

Lecture	Topic
1	Algebraic structures
2	Generators and relations
3	Categories and functors
4	Actions and representations
5	Problem session
6	Algebras and modules
7	Localizations
8	Commutative algebra
9	Affine varieties
10	Problem session

Student presentations

After the above lectures, there will be presentations by the participants. These will take place
in the second half of the spring semester and are part of the criteria to pass the examination
(see below).

Your presentation should be on some topic in algebra that you go into more deeply than
what will be explained in the lectures. If you are a PhD student in algebra, you must choose
a topic significantly different from you thesis topic. If not you should instead choose a topic
that is related in some way to your thesis topic. The hope is that in this way everyone

will learn something interesting and algebra students don't have too much of an advantage. Please start thinking about possible topics as soon as possible an discuss with me. Once we agree, the topics will be fixed and we will make a schedule for presentations.

Examination

There will be two sets of problems during the course. Each problem set gives at most 100 points. To pass the course you must submit solutions to both problem sets, get at least 25 points for each set and a total of at least 90 points. I expect that submitted solutions are written in your own words and that you will be able to explain them in case I ask.

In addition to the problem sets you must give a presentation on a topic in algebra chosen in agreement with me as explained above.